Miracle Rock Mining and Research L.L.C.

400 S. 200 E.
Emery, UT 84522
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TASK 3037
cc Wayne

0006

June 18, 2009

Minerals Program
Division of Oil, Gas & Mining
1594 W North Temple Ste 1210
Salt Lake City, UT 84114-5801

RE: Clean Copy Submittal, Miracle Rock Mining & Research, The Rockland Mine, M0150040, Task 2508, Emery UT

Miracle Rock Mining & Research, owner and operator of the Rockland Mine (permittee), hereby submits the clean copies for the Division's tentative approval to Commence Large Mining Operations.

Two clean copies of the Rockland Permit are included with this submittal and includes all text sections, tabbed Maps Section, tabbed Appendices Section, tabbed Photos Section, tabbed Figures Section, and tabbed BMP Section. Please replace these sections in the three-ringed binders provided from on e of the earlier submittals.

Form MR-REV is included with this submittal to provide assistance in placement of the approved permit information. As required by your April 30, 2009 letter, form MR-RC is also included for signatory provisions of the bonding agreement. If you have any question or concerns regarding this submittal please contact me at 435-286-2222.

Sincerely,

David Taylor
President

Enclosures MR-REV
MR-RC
Clean Copies-Text Section, Maps Section, Appendices, Photos, Figures, BMP Section

Cc Dennis Oakley

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R647-4-104 OPERATOR(S), SURFACE AND MINERAL OWNER(S)

Mine Operator and Owner

Mine Name: Rockland Mine
Applicant: Miracle Rock Mining and Research
Address: PO Box 76
400 South 200 East
Emery, Utah 84522
Phone: 435-286-2222
Fax: 435-286-2322

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Company Representative:
David Taylor (President)

Surface and Subsurface Ownership

The Rockland Mine is located approximately 5.0 miles southeast of the town of Emery, Utah in Section 2, Township 23 South, Range 6 East, SLB&M. Refer to Map R105-1A (Mine Location Map) in the Map Section for the mines location. The location is represented on the Mesa Butte USGS 7.5 minute quad map.

The surface and subsurface is managed by the State Institutional Trust Lands Administration (SITLA). The contact information for this Utah State government agency is:

State Institutional Trust Lands Administration
675 East 500 South
Suite 500
Salt Lake City, Utah 84102-2818

Miracle Rock Mining and Research basis their right to conduct mining operations in the area denoted on Map R104-1A by the signed agreements, covenants, terms, and conditions of the Utah State Mineral Lease (Lease No. ML-50776). State mineral lease ML-50776 contains approximately 161.80 acres, more or less, and its location is better described as:

T23S, R6E, SLB&M
Sec. 2 Lot 2 (40.68 acres), Lot 3 (41.12 acres), SW1/4NE1/4, NW1/4SE1/4

A copy of the lease is filed at the Miracle Rock Mining and Research main office in Emery County, Utah and at the SITLA offices in Salt Lake City, Utah.

Adjacent surface and subsurface is managed by the Bureau of Land Management (BLM). The BLM have been notified of said mining operations. Refer to Map RM-104-2A in the Maps Section to review stated land ownership of the Rockland Mine and surrounding area.

R647-4-106 Operation Plan

This section contains a narrative explaining the operations at the Rockland Mine site. Maps, drawings, appendices, and tables are referenced, as necessary, to detail all processes associated with the operations of the mine.

R647-4-106.1 Mine Type and Operations

Miracle Rock Mining and Research owns and operates the Rockland Mine and is Lessee to approximately 161.80 acres of land in Emery County. Miracle Rock Mining and Research was granted lease (ML-50776) by State and Institutional Trust Lands Administration (SITLA) for the purposes of mining the mineral known as humate or humic shale.

R647-4-106.2 Mine Operations

Humate is a weathered coal or carbonaceous mudstone or shale that contains large amounts of humic acid. Humic acids are mixtures of colloidal organic molecules, with molecular weights between 5,000 and 50,000 grams, that result from decay of organic matter (Gloyn et al, 2003; Siemers and Waddell, 1977). The Rockland mine produces humate from the Upper Cretaceous Ferron Sandstone Member of the Mancos Shale. The humic shale is process and used primarily for soil amendments for agriculture. Other processing techniques might use the humate for a nutritional supplement for human consumption (UGS Bulletin #132, 2003).

Abundant humate occurs in coal of the Ferron Sandstone. The Rockland Mine mines approximately 6,000 tons annually of the product from outcropping deposits. Overburden consists primarily of alternating thick to massive beds of tan, yellow-gray, mostly medium-grained sandstone, shaley sandstone of the same color and shale. The shales are clayey, silty and carbonaceous (H.H. Doelling, 1972). The thickness of the overburden at the Rockland Mine varies between six to fifteen feet.

Prior to the classification of a large mining operation, the Rockland Mine operations included underground room and pillar mining methods to extract the ore. Underground operations are accessed utilizing two portals. These portals area located on the north end of the mine pad as shown on the surface facilities map (Map R106-1A in the Maps Section).

Room and pillar mining is commonly conducted on flat or gently dipping bedded ores. Pillars are left in place in a regular or irregular pattern while the rooms are mined out. Mining methods consisted of drill and shoot operations. Utilizing this method, miners drill a series of holes in the ore face and load with an explosive powder. The powder will be charged and detonated to break up the ore. The ore is then loaded and transported out of the mine.

Underground operations continued until development intersected an underground dike. At this point underground operations were halted and surface operations commenced using highwall mining methods. To date, there is approximately 1500 feet of exposed highwall with two working faces. The underground operations have been gated and locked to prevent access. The two portals will remain open (e.g. portals not backfilled with soil or rock material) until it is

decided that underground operations are no longer feasible. At that time the portals will be backfilled and reclaimed as described in the R647-4-110 Reclamation Plan. If underground mining operations resume at some point in the future, the operator may consider conducting a geotechnical analysis of the mine workings to ensure that the portals and overburden are safe for room and pillar operations.

Highwall mining methods at the Rockland Mine are conducted in a four step process. The initial step is to remove and stockpile topsoil. Topsoil in the mining area is only approximately two to four inches in depth and lies on a four to six foot layer of solid sandstone overburden. After the topsoil has been segregated and stockpiled (refer to the Surface facility Map R106-1A for storage locations), the sandstone overburden is drilled by hand and shot using explosives to break up the sandstone for removal. A detailed blasting plan is outlined in Appendix A. The overburden is removed using a track-hoe and/or loader and hauled to the subsoil storage area. The subsoil pile is located on the south end of the pad as shown on Map R106-1A.

Once the overburden is removed a track-hoe is used to cut the humic shale ore from the face. The ore is loaded into haul trucks and hauled off-site directly to a processing facility. No humic shale ore is stockpiled on-site within the disturbed area of the Rockland Mine.

R647-4-106.3 Description of Mine Facility Pad

Currently, the disturbed area consists of approximately 5.82 acres. This area consists of an access road and mine pad. The mine pad is utilized for active mining operations and for stockpiling overburden materials. The stockpile is located on the south end of the pad and encompasses approximately 0.25 acres. As mentioned above, the two active mining areas are located on the far south end and west end of the mine site. Active mining operations utilize less than one acre.

The mine facilities include two portal entrances, subsoil stockpile, fueling area, waste disposal area, and temporary storage shed. The location of these facilities is documented on the Surface Facilities Map (Map R106-1A) in the Maps Section. Each mine facility is described below.

Portals were developed for access to underground operations. Each measure approximately 12.0 feet wide by 7.0 feet high. Since underground operations are no longer active, each portal consists of a gated opening to restrict access into the mine. Once it is decided that underground operations are no longer required, these openings will be backfilled and reclaimed by the methods approved in Section R647-4-110 Reclamation Plan.

The fueling area is a small area near the portals that consist of a 500 gallon diesel tank and oil storage. The fuel tank has been placed in a container which acts as an environmental control to contain the tank contents in case of an accidental spill.

The waste disposal area is located on the west end of the mine pad. Waste from mining operations is temporarily stored at this location. Periodically, wastes will be loaded in a truck and hauled to an approved landfill.

The access road utilizes an area of approximately 0.5 acres. Public access is restricted utilizing a gated entrance from Emery County road EC915. The gate is kept lock at all times when mine is idle. When in operation, traffic is routed up the road to the mine pad. The access road is the only access to the mine pad. Safety berms have been constructed on both sides of the road to provide a barrier between the road and the steep slopes below.

R647-4-106.5 Existing Soil Types

As reported by Leland Sasser of the USDA Natural Resource Conservation Service (refer to Appendix B), three types of soils predominate the area of the Rockland Mine; Travessilla, Casmos, and Moffat soils. Morphology of each of the three taxonomic units is characterized as described by the National Cooperative Soil Survey, 1988.

Travessilla Series

The Travessilla series consists of shallow, well drained, moderately permeable and moderately rapidly permeable soils on mesas, benches, canyon sides, mountain slopes, and foot slopes. These soils formed in residuum and colluviums derived dominantly from sandstone and interbedded shale. Slope is 1 to 80 percent. Elevation is 5,000 to 8,700 feet but is dominantly 5,500 to 6,500 feet. Average annual precipitation is 10 to 14 inches, and average annual air temperature is 45 to 50 degrees F.

These soils are loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents.

A1 0 to 2 inches; brown (10YR 5/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak thick platy structure; soft, very friable; few fine and medium roots; few fine pores; slightly calcareous; mildly alkaline (pH 7.6); clear smooth boundary.

C1 2 to 5 inches; brown (10YR5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak fine subangular blocky; soft, very friable; few fine and medium roots; few fine pores; 15 percent channers; mildly alkaline (pH 7.5); clear smooth boundary.

C2 5 to 10 inches; brown (10YR 5/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable; few fine and medium roots; moderately calcareous; mildly alkaline (pH 7.6); abrupt wavy boundary.

R 10 inches; sandstone.

Bedrock deph is at a depth of 7 to 20 inches.

Casmos Series

The Camos series consists of shallow, well drained, moderately permeable soils on summits, pediment slopes, and canyon sides. These soils formed in residuum and colluviums derived from siltstone and shale from the Green River Formation. Slope is 2

to 70 percent. Elevation is 4,700 to 6,000 feet. Average annual precipitation is 6 to 8 inches, and average annual air temperature is 48 to 50 degrees F.

These soils are loamy, mixed (calcareous), mesic Lithic Torriorthents.

A1 0 to 2 inches; pale brown (10YR 6/3) channery loam, brown (10YR 5/3) moist; weak fine granular structure; slightly hard, friable, sticky and plastic; few very fine and fine roots; few very fine pores; 15 percent channers and 5 percent stones; moderately calcareous; disseminated calcium carbonate; strongly alkaline (pH 8.6); abrupt smooth boundary.

C1 2 to 6 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; weak medium subangular structure; slightly hard, firm, sticky and plastic; few very fine and fine roots; few very fine pores; 10 percent channers; moderately calcareous; disseminated calcium carbonate; strongly alkaline (pH 8.6); very wavy boundary.

R 6 inches; hard siltstone.

Bedrock is at a depth of 5 to 13 inches.

Moffat Series

The Moffat series consists of very deep, well drained, moderately rapidly permeable soils on alluvial fans and benches. These soils formed in alluvium derived from sandstone and shale. Slope is 3 to 6 percent. Elevation is 5,400 to 5,800 feet. Average annual precipitation is 6 to 8 inches, and average annual air temperature is 48 to 50 degrees F.

These soils are coarse-loamy, mixed, mesic Typic Calciorthids.

A1 0 to 2 inches; brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) moist; weak fine granular structure; soft, friable; few fine and medium roots; many very fine, common fine, and few medium pores; moderately calcareous; moderately alkaline (pH 8.4); abrupt smooth boundary.

B2 2 to 9 inches; brown (7.5YR 4/4) fine sandy loam, dark brown (7.5YR4/4) moist; weak medium subangular blocky structure; soft, friable; few fine and medium roots; many very fine, common fine, and few medium pores; moderately calcareous; moderately alkaline (pH 8.4) ; abrupt smooth boundary.

C1ca 9 to 21 inches; pink (7.5YR 7/4) fine sandy loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; hard firm; few very fine, fine, and medium roots; many very fine and common fine pores; strongly calcareous; coating of calcium carbonate on faces of peds; strongly alkaline (pH 8.8); clear smooth boundary.

C2ca 21 to 29 inches; pinkish white (7.5YR 8/2) fine sandy loam, pink (7.5YR 7/4) moist; moderate medium subangular blocky structure; hard, firm; few very fine and fine roots; common very fine and few fine pores; strongly calcareous; disseminated calcium carbonate; strongly alkaline (pH 9.0); gradual wavy boundary.

C3 29 to 60 inches; pink (7.4YR 8/4) fine sandy loam, light brown (7.5YR 6/4) moist; massive; very hard, very firm; few very fine and fine roots; common very fine and few fine pores; 5 percent pebbles and 5 percent cobbles; strongly calcareous; disseminated calcium carbonate; strongly alkaline (pH 9.0)

Secondary calcium carbonate is at a depth of 9 to 15 inches.

R647-4-106.6 Segregation and Storage of Soils

As part of the highwall mining process soils and rock are removed to uncover the mineral to be mined and processed. At the Rockland Mine, topsoil depth is between two and six inches. This material is removed using a front-end loader (or similar equipment) and stored in piles above the highwall and throughout its length (refer to Surface Facilities Map, Map R106-1A). A series of photos were taken of the existing soil piles. These photos can be reviewed in the Photos Section. Organic material such as tree parts, shrubs, grasses were mixed with the topsoil material as the piles were constructed. Piles were made relatively small in a cone or wedge shape. There is approximately 680 cubic yards of topsoil presently stored for use in reclamation (refer to Soil Salvage Summary Table in Appendix C). The volume of the piles will change throughout the life of the mine as material is added from mining activities or subtracted for reclamation activities.

The topsoils are protected by keeping them segregated from the active mining activities. Prior to drilling and blasting activities topsoils are stripped and stored away from the top of the highwall area. The shot material is thrust onto the mine pad where below where the broken up rock and subsoil is segregated and stored.

The storage location for the subsoil is on the south side of the mine pad (refer to Map R106-1A). Subsoil is gathered with a front-end loader, hauled and piled at this location. A portion of the subsoils are used to create a safety berm around the perimeter of the mine pad. There is approximately 4,270 cubic yards of material presently stored for use in reclamation. The volume of the pile will change throughout the life of the mine as material is added from mining activities or subtracted for reclamation activities. A Soil Salvage Summary Table is found in Appendix C. This table includes both topsoil and subsoil and will be updated from time to time to keep the stored volumes current.

Sampling of the segregated soil piles was conducted in 2005 and 2007 (refer to analysis in Appendix D). This sampling indicated that there exist acid forming materials (pH below 6.0) in the top 1.0 feet of the subsoil material on the south end of the storage pile (see photo titled "Subsoil"). The extent of the acid forming materials is undetermined and will not be known until the soil is moved from this pile. Upon use, extensive field testing will be conducted to ensure this soil is buried so not to impact vegetation growth at reclamation.

Larger rocks have been gathered and stored at various locations on the mine pad. These rocks will be used for barricades to protect mine structures, fueling areas, etc. Once reclamation commences at the Rockland Mine, these materials (rock, subsoil, topsoil) will be utilized for backfilling the highwall. Special placement sequences of these materials are addressed in the Reclamation Plan. Refer to Section R647-4-110.5 Soil Redistribution and Revegetation prior to moving these materials.

R647-4-106.7 Vegetation

The Rockland Mine disturbed area covers approximately 5.82 acres. Prior to disturbance, the native vegetation of the mine and surrounding area consisted of trees, shrubs and grasses. Tree varieties consist of pinions (*Pinus edulis*) and Utah junipers (*Juniperus osteosperma*). A diverse shrub community exists in the area with the major types being black sagebrush (*Artemisia nova*), shadscale (*Atriplex confertifolia*), fourwing saltbrush (*A. canesens*), and galleta (*Hilaria jamesii*). Grasses typical of the area include salina wildrye (*Leymus salinus*), and Indian ricegrass (*Oryzopsis hymenoides*).

A vegetation survey was conducted on an undisturbed area adjacent to the mine site. Twenty transects were evaluated using an ocular method (line intercept method) for estimating percent cover by type. Types recorded are living cover, litter, rock cover, and bare ground. Living cover is broken into two components; understory and canopy cover.

Results of the survey found an understory cover of only 2.7% and canopy of 24.3%. Canopy consisted of pinyon pine and Utah juniper cover. Litter averaged only 1% of the total cover, while no rock or rock fragments were found in the study area. Bare ground averaged 63% of the total area. A spreadsheet of the vegetation survey is found in Appendix E. Based on the results of the vegetation survey, revegetation must achieve a success standard of 70% of the pre-mining vegetative ground cover or 18.9%.

R647-4-106.8 Geology

As mentioned above, the Rockland is located stratigraphically in the Upper Cretaceous Ferron Sandstone Member of the Mancos Shale. The topographic setting consists of massive beds of very fine- to fine-grained sandstone, carbonaceous shale, coal, mudstone, and siltstone. Outcrops of the Ferron Aquifer exist near the area of the Rockland Mine. The potentiometric surface of the aquifer, however, indicates that recharge comes from the Wasatch Plateau to the west (UGS Bulletin #132, 2003).

The mine site lies approximately 500 feet above the Quitchupah and Muddy Creek drainages. These deep drainage systems form the boundary of the outcropping aquifer. No ground water wells exist in the area. The surface drainage system of the Rockland Mine area is confined exclusively to the Muddy Creek drainage system. Any precipitation that falls on the mine site reports to ephemeral drainages and eventually to this system.

References

Gloyn, R.W. et al, Energy, Mineral, and Ground-Water Resources of Carbon and Emery Counties, Utah, Utah Geological Survey, Bulletin 132, 2003, pg. 111, referencing Siemers, C.T., and Waddell, J.S. 1977, Humate deposits of the Menefee Formation (Upper Cretaceous, northwestern New Mexico, *in* Fasset, J.E., editor, San Juan Basin III, Supplement to Guidebook: Albuquerque, New Mexico Geological Society Guidebook, 28th Field Conference, p. 1-21.

Utah Geological Survey, Bulletin 132, Gloyn, R.W. et al, Energy, Mineral, and Ground-Water Resources of Carbon and Emery Counties, Utah, 2003, p. 111-112.

Doelling, H.H., Central Utah Coal Fields: Sevier-Sanpete, Wasatch Plateau, Bookcliffs and Emery, Monograph Series No. 3, 1972, Utah Geological and Mineralogical Survey, p. 424.

National Cooperative Soil Survey, Soil Survey of Carbon Area, Utah, United States Department of Agriculture, Soil Conservation Service, Issued June, 1988.

R647-4-107 OPERATION PRACTICES

This section contains a narrative explaining the operational practices at the Rockland Mine site. The narrative describes in detail all practices that the operator must conform to during the everyday operations of the Rockland Mine.

R647-4-107.1 Public Safety

The management at the Rockland Mine is conscience of the hazards associated with mining and has taken precautionary steps to reduce or eliminate hazards that may affect public safety and welfare during operations. Some notable steps discussed below include, but not limited to; lockable main gate, "No Tresspassing" signs, gated restrictions to portals, berms, etc. Photos of these practices are also found in Photos Section.

Lockable Main Gate – A lockable main gate has been installed at the only access to the mine pad. The gate is constructed with 2" steel square tube hinged and mounted on vertical 6" steel pipe cemented in place. The gate extends across the access road and is winged on either side to prevent any unauthorized vehicle passage.

"No Trespassing" Signs – A "No Trespassing" sign has been mounted on the access gate to inform uninvited guests that trespassing is not allowed.

Gated Restrictions to Portals – Two portal openings accessing underground workings are located on the mine pad. Gates have been placed over the openings to discourage entry.

Berms – A safety berm is constructed along the outer edge of the mine pad. This berm prevents vehicles and equipment from accidentally rolling off the mine pad and down the slope. The berm also keeps runoff within the confines of the mine pad.

These and other practices have been successfully utilized to protect public from the many hazards that are associated with mining operations.

R647-4-107.2 Drainages

As shown on the Drainage Control Map (Map R107-1A), there are two undisturbed ephemeral drainages adjacent to the disturbed area that could potentially be impacted by runoff from the disturbed area. The drainages are noted as UD-1 and UD-2. Disturbed areas that flow into these drainages are noted on the Map as DA-1 and DA-2. A third ditch, UD-3, is located above the highwall and diverts undisturbed runoff away from the mine site. Each area is discussed below. Runoff volumes from these areas have been calculated and best management practices (BMP's) have been designed accordingly.

Disturbed Area 1 (DA-1)

The mine pad area consists of hydrologic area DA-1. Its size is approximately 3.4 acres. All flow is confined to the pad and impoundment area. Any precipitation that falls onto the mine pad either puddles or flows as indicated by the flow lines on Map R107-1A. Runoff volumes have been calculated for the pad area using a 10 year/24 hour precipitation event of 1.51 inches. Peak discharge from the pad is 0.15 ac/ft.

Disturbed Area 2 (DA-2)

The area below the mine pad where material has been cast off the side slope consists of the hydrologic area DA-2. The material consists mainly of pebble to boulder sized rock and is highly permeable. No erosional effects have been indicated on the surface of these slopes. BMP's will not be used at the toe of the slope until final reclamation.

Undisturbed Drainage (UD-1)

Flow from the mine pad flows into the impoundment located on the east side of the pad. Discharge from the impoundment is treated before flowing into UD-1. Drainage UD-1 drains into an un-named ephemeral drainage which eventually flows into the Muddy River.

Undisturbed Drainage (UD-2)

Overland flows (if any) from the mine pad slopes drain into UD-2. This undisturbed drainage flows directly into the Muddy River drainage system.

Undisturbed Diversion (UD-3)

Ditch UD-3 is a historic diversion ditch that was cut with a bulldozer along an existing road above the mine site. This ditch diverts undisturbed runoff away from the topsoil storage area and directs flow into a natural drainage system. The natural drainage, like others in the area, are ephemeral and flow as a result of precipitation events.

R547-4-107.3 Erosion Control

Sediment control measures have been implemented on the disturbed area to minimize additional contributions of sediment solids to the receiving drainage. Best management practices are used to control erosion and sedimentation from mining operations. BMP's include some of the following controls; berms, impoundments (refer to photos), straw bales, silt fences, etc. Surface water quality will be protected by handling earth materials and runoff in a manner that minimizes the potential for pollution. Locations of sediment control practices are shown on the Drainage Control Map (Map R107-1A) in the Maps Section. Specifications for BMP installation are detailed in the tabbed BMP Section.

The Rockland Mine has submitted a Notice of Intent (NOI) to the Division of Water Quality to comply with the requirements of the Clean Water Act. This NOI permits the site to discharge storm water associated with their industrial activity into the waters of the United States. As part of this permit, a Storm Water Pollution Prevention Plan (SWPPP) has been developed for the site. Refer to Appendix F for review of this plan.

Analysis of the stored overburden samples tested has shown that toxic materials are present on-site (refer to Appendix D for soil sample results). Discharges if any, of water from areas disturbed by mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for mineral mining promulgated by the EPA set forth in 40CFR Part 434.

R647-4-107.4 Deleterious Materials

All deleterious or potentially deleterious materials shall be safely removed from the site or kept in an isolated condition such that adverse environmental effects are eliminated or controlled. Best management practices (BMP's) will be used to minimize contact of materials with rainfall and runoff. BMP's may be structural or non-structural controls that reduce or eliminate pollutants in storm water runoff.

R647-4-107.5 Soils

As mentioned above, soils, including topsoil and subsoil, are removed, segregated, and stored in a stable condition so that they may be used for reclamation. Storage locations are identified on the Surface Facilities Map (Map R106-1A) in the Maps Section.

R647-4-107.6 Concurrent Reclamation

Occasionally, during operations, disturbed areas may be reclaimed when no longer needed. All areas which have been disturbed but are not routinely or currently utilized will be kept in a safe and environmentally stable condition. Contemporaneous reclamation will comply with the plans outlined in R647-4-110 and R647-4-111. As these areas are reclaimed, the area reclaimed will be outlined on a map and reported to the Division.

APPROVED

AUG 19 2009

DIV. OIL GAS & MINING

R647-4-108 HOLE PLUGGING REQUIREMENTS

There are currently no drill holes located within the lease boundaries of the Rockland Mine site. If drilling is needed in future operations, the requirements of R647-4-108 will be followed and the holes will be identified on a map.

R647-4-109 IMPACT ASSESSMENT

The following narrative identifies potential surface and/or subsurface impacts to water, wildlife, soil, slope stability, erosion control, air quality, and public safety.

R647-4-109.1 Impacts to Surface and Ground Water Resources

As with any mining operation, there exists an inherent risk to impacting the surface and/or ground water quality resources. Impacts to surface water quality is minimized by the use of BMP's as outlined in R647-4-107 Operation Practices and the SWPPP. BMP's are designed to reduce or eliminate contact of potential pollutants with rainfall and runoff. Also, by incorporating good housekeeping practices at the mine site and conducting preventative maintenance on erosion and sediment control structures, impacts to surface ground water resources will be negligible.

Potentiometric ground water resources have been documented approximately 500 feet below and west of the surface of the mine site. Recharge areas have been reported to the west, high on the Wasatch Plateau and along the outcrop of the Ferron aquifer in the Muddy and Quitchupah drainage. Potential for mine site pollutants affecting this resource is negligible at best. Prevention will be maintained by utilizing the practices outlined above.

R647-4-109.2 Impacts to Wildlife

There have been no state or federal threatened or endangered species documented within the lease area of the Rockland Mine. No impacts will be realized from mining operations.

R647-4-109.3 Impacts to Soil Resources

Impacts to soil resources due to mining and reclamation operations are considered temporary. Soil materials have been segregated from mining operations for protection. Once mining operations have been completed, reclamation will commenced to return the area to its approximate original contour. Impacts due to erosion have been detailed above.

R647-4-109.4 Projected Slope Stability, Erosion Control, Air Quality, and Public Safety Impacts

The following sections cover projected impacts to slope stability of the highwall area, disturbed area erosion, operational affects to air quality, and potential impact to public health and safety and what actions are proposed to mitigate those impacts.

Slope Stablility

There is approximately 1500 feet of highwall exposed at the Rockland Mine. Slopes are developed nearly vertical and up to approximately 30 feet in height. Overburden is only four to six feet thick and comprises of mostly solid sandstone. Underlying this

overburden is eight to 12 feet of mineral product. Highwall failure has not been a problem in the past because no groundwater exists in the area of mining and the rock mass of the overburden is structurally sound.

Rockfall problems have been managed utilizing scaling method to remove potential fall areas. Scaling is conducted immediately after blasting activities and the removal of the overburden. Scaling is completed using track-hoe bucket removing all loose rock material. No undercutting of the mineral product will occur. In the occurrence highwall stability becomes a problem, slope geometry modification and/or benching methods may be necessary. The operator may opt for a geotechnical analysis and a modified highwall design if necessary. The Division will be consulted on any modification in highwall design prior to utilizing other methods than those that are currently used.

Erosion

Erosion and sediment control practices have been previously addressed in R647-4-107 Operation Practices. A Storm Water Pollution Prevention Plan (SWPPP) as required by the Division of Water Quality is maintained at the owner's main office in Emery, Utah. A copy of this document is also found in Appendix F.

Air Quality

Impacts to air quality resources due to mining and reclamation operations are considered temporary. Emissions realized on the mine site are from equipment, blasting, loading and hauling operations. There are no permitting requirements required by the Division of Air Quality for this mining operation.

Public Safety

Public safety issues have been addressed at the Rockland Mine. There is only one access road into the mine site from Emery County Road 915. The mine entrance has been gated and is locked when idled to prevent public access into the mine site. A sign identifying the phrase, "NO TRESSPASSING" is installed on the locked gate.

R647-4-110 RECLAMATION PLAN

This section contains a narrative explaining the plan for reclaiming the Rockland Mine site. The section references maps, drawings, appendices, and tables, as necessary, to detail processes used for reclamation.

R647-4-110.1 Post Mining Land Use

The current post mining land use of the area is grazing and recreation. Reclamation practices and procedures have been designed to support the post mining land uses of the area.

R647-4-110.2 Reclamation Description

The areas at the Rockland Mine that will be reclaimed include the following:

- Access Road Removal
- Highwall Elimination
- Slope Construction
- Impoundment Removal
- Drainage and Natural Drainage Pattern Development
- Portal Backfilling

These features to be reclaimed or developed as part of the reclamation plan for post mining land uses are described in detail below. A series of Reclamation Treatment Maps (Map R110-1A through RM-110-4A) are found in the Maps Section. These maps show the reclamation treatments utilized for returning the disturbed areas back to their close original contours for supporting the prescribed post mining land use.

Access Road Removal

The Rockland Mine has one (1) access road to the mine site. Initial road construction consisted of grading native material to the outcropping Humic Shale. The access road follows the natural contour of the land to the mine pad site. It is approximately 700 feet in length on a 23% grade and averages 15 feet wide.

Reclamation of the road will utilize a track mounted back-hoe and dozer. Reclamation of the road will be conducted after all other mine site features have been reclaimed. Upon completion of the mine pad and slopes, reclamation will continue following the disturbed footprint of the road. A dozer will rip the road base to a depth of approximately 18 inches. A track-hoe will commence contouring to blend the disturbed area to match the contour of the surrounding area. When a matching contour has been achieved (field fit), pocks will be placed randomly throughout the disturbed area. Pocks will be sized approximately 1.5 to 3.0 feet in diameter by 12 inches to 1.5 feet deep. Pocks are designed to control erosion by trapping runoff.

Highwall Elimination

There is approximately 1500 feet of highwall exposed at the Rockland Mine site. The highwall was constructed to either access underground workings or to surface mine the mineral of interest. In any case, the highwall will be reclaimed to the extent possible.

It is proposed to reclaim the highwall areas utilizing the existing materials cast off the pad area, the salvaged subsoil, and the segregated topsoil. Materials used to backfill highwalls will not exceed a 3h:1v slope nor with reclaimed highwall (cutslopes) exceed a 1h:1v or 45° slope.

The pre-mining topography of the mine site was never analyzed and, therefore, the contour must be assumed. Figure 110.2-A in the Figures Section illustrates a probable pre-mining topography. The general area consists of steep to very steep escarpments and ridges. The mined mineral is capped with sandstone that ranges from 5 to 20 feet. The photo entitled "Adjacent Undisturbed Areas" shows a representative area east of the mine site. The mined shale lies between two sandstone formations. Weathering and geologic erosion has created rocky areas (see "Weathered Rock Escarpments") where little plant growth occurs. Hillsides below the mined mineral are less steep 2-20% slopes consisting mostly of grasses and shrubs.

Three (3) areas throughout the mine site were cross-sectioned to aid in estimating the volume of materials available for reclamation; 1) portal area, east side, and west side. Each of the areas measured were nearly identical. Therefore, for simplicity sake, only one typical cross-section will be used to illustrate highwall elevations, pad widths, and slope lengths. Volumes are estimated by calculating the areas of cut and fill in the cross-section and multiplying by the length of highwall. Please note that because no data exists of the pre-mining topography, actual volumes found in the field during reclamation activities may be different than estimated volumes proposed in this plan. Refer to Figure 110.2-B to review the areas where soil volumes have been estimated. The table in the Appendix C summarizes the volume of subsoil and topsoil available for reclamation. Cut and fill volumes are shown below in Table 1:

Table 1. Summary of Soil Volumes

Area	Area of Polygon (ft2)	Volume (yd3)
Fill Volume	*595.1*	*33,061.1*
Cut Volume	*588.7*	*32,705.6*
Subsoil Volume	*See Appendix C*	*4269.4*
Topsoil Volume	***See Appendix C***	***681.9***

As shown in the table above, there is more material available (cut, subsoil, topsoil volumes) for reclamation than what is needed (fill volume). Computing the balance between the cut and fill, there is approximately a 12% difference in the cut and stored material than there is fill volume. This variability should allow some flexibility in the design where there exists the possibility that actual volumes will not match the calculated volumes.

Reclamation Procedures for Highwall Elimination

In order to eliminate highwalls to the extent practical, the following process will be used. The first step in highwall reclamation is to seal and backfill all portal entrances. A portal backfilling and sealing plan is detailed below and illustrated in Figure 110.2-D. Reclamation will begin on the east end and work toward the portal area to the access road. At this point reclamation activities will commence on the west side of the mine area and also work toward the access road. When all highwalls have been reclaimed and the area regraded, reclamation activities will continue down the access road until all disturbed areas have been reclaimed.

Equipment used for reclamation may include a dozer, track-hoe, and dump truck. Highwall cuts will be backfilled utilizing a track-hoe by pulling the cast material off the outslope on to the pad (landing) areas. A dozer will then push the excavated material to backfill exposed highwalls. Toxic and/or acid forming materials found on-site will be buried during this process. Subsoil and topsoil will be placed on the fill material at the grade and thickness shown on Figure 110.2-C.

At the completion of the backfilling of highwalls, the exposed vertical cliffs (i.e. remaining highwall not covered by backfilling) will be drilled and shot. The process will break the sandstone cap to form large boulders that will collapse to the reclaimed slope. This process will eliminate the steep cliff hazard, provide cover for small mammals, provide shade protection to vegetation, control erosion, and provide an aesthetic value that mimics the slopes and ridge tops of the adjacent areas. All blasting activities will be conducted as required by the blasting plan and other State and Federal regulations. Refer to the blast plan in Appendix A.

Slope Construction

To the extent practical, native or cut slopes will be regraded to the configuration in which they were prior to mining. Because this configuration is not documented on pre-mining topography maps, slopes will be excavated to the native material. Native or cut slopes are not subject to the 3h:1v grade requirement. As the native slopes are exposed, they will be roughened by pocking and reseeded. Seeding will be conducted as explained in the Soil Redistribution and Revegetation Section below.

Fill slopes will be regraded to the 3h:1v configuration as shown on Figure 110.2-C. These slopes will be covered with subsoil and topsoil, deep gouged, and reseeded as detailed in the following sections. All slopes constructed will be blended into the natural topography to mimic the slopes in the undisturbed areas.

At the south end of the pad area, backfilling activities will be contoured to form an ephemeral channel. The length of the channel is approximately 200 feet and the rise is approximately 50 feet equating in a slope of 4H:1V. With a slope this minor, it would not be advantageous for creating a design for this channel; however, the channel will be armored with rock riprap for extra protecting against erosion. Refer to any of the 110 series maps in the Maps Section for review.

Impoundment Removal

One impoundment exists within the disturbed area of the site. This impoundment is located mid-way and along the south side of the access road. The impoundment measures approximately 15 feet in diameter by 3 feet deep. This impoundment has been constructed to treat runoff from the mine pad area and a portion of the access road area. During road reclamation, the impoundment will be reclaimed to compliment the topography of the surrounding area. The contour of the regraded area will be identical to the adjacent undisturbed area.

Drainage from the impoundment was routed along the side of the road to a natural drainage approximately 700 feet away. This area will be reclaimed as part of the road reclamation and no other drainage will be constructed.

Erosion control will be provided using deep gouging techniques. Deep gouges are constructed to retain moisture, minimize erosion and create and enhance wildlife habitat.

The entire area will be reseeded with the approved seed mix in Table 2.

Drainage and Natural Drainage Development

There are two small natural ephermal drainages that will pass through the disturbed area. The first drainage passes under the access road near the mine gate and is approximately 20 feet in length. This drainage will be reclaimed by first removing the culvert. The reestablishment of this small section will be constructed to match the upstream and downstream dimensions and will provide adequate drainage through this small area. Since this process only impacts approximately 20 feet of drainage, it will be considered negligible and field fit during reclamation. Refer to Map RM-110-4A for detail.

The second drainage is located above the mine workings. Overland flow concentrates in a small ephemeral channel and is currently diverted around the mine workings to the east and west. At reclamation, flow from this area will be diverted over the constructed fill slope as shown on Map RM-110-4A. The upland drainage area is approximately 4.0 acres. Appendix G illustrates the hydrograph utilizing OSM's STORM runoff modeling program for a 100yr/24hr event of 2.48 inches of precipitation. This software predicted a flow from the upland area of 1.83 cfs. Although a very small amount of flow, the reconstructed fill slope will need protection to reduce or limit the probability of slope failure uncovering potentially toxic fill material.

The channel design feature with the STORM program was utilized to design a triangular channel. As shown in Appendix H, the channel will have side slopes of 3:1 and a depth of approximately 1.0 feet. Actual flow depth from the 100 year storm is approximately 0.27 feet giving a freeboard of nearly 9 inches. Figure 110.2-E illustrates the typical design of the triangular channel which will protect the fill slope from the erosive forces of storm water runoff.

Two other very small ephermal drainages exist above the mine site. These channels can be simply diverted to the east and west of the mine workings into existing natural channels. These diversion ditches are shown as UD-3 and UD-4 on Map RM-110.4A.

As part of the fill design on the south end of the mine workings, a concentrated flow pattern will be developed. Because of the very limited area that intercepts precipitation, there is no need to develop a designed channel for the potential flow. The slope will be protected using riprap in the bottom of the concentration flow area. Riprap (sized to approximately 4-8 inches) will be placed approximately 1 foot deep by approximately 2 feet wide. This will be sufficient to protect the slope from the erosive forces of storm water runoff. The reclaimed slopes will also be pocked to limit overland flow.

Portal Backfilling

There are portals that provide access to underground workings of the Rockland Mine. They exist on the north side of the facility near the top of the access road. Refer to Map R106-1A for their locations. Figure 110.2-D illustrates how portals will be sealed and backfilled. Essentially, portals will be backfilled at least 10 feet inby the opening with overburden material. Backfilling will require approximately 63 cubic yard of material to complete. Highwall reclamation, as described above, will cover the backfilled openings completely and eliminate all access to underground workings.

R647-4-110.3 Post Mining Facilities

At the completion of mining and reclamation operations, all facilities, structures, piles, ponds, etc. will be reclaimed as outlined in the reclamation plan. No post mining structures or facilities will be left as part of the post mining land use for the Rockland Mine site.

R647-4-110.4 Acid Forming Material Disposition (Refer to table in Appendix C for segregated soil volume calculations)

The existing subsoil pile is located on the south side of the mine site. This stockpile contains approximately 4,269 cubic yards of material stored for use in reclamation. However, soil samples taken in 2005 and 2007(see analysis in Appendix D) indicate that there are acid forming materials (below pH of 6) in the top 1.0 feet of material on the south end of the pile. The extent of the acid forming materials is undetermined. However, for reclamation planning purposes, 20 feet on the south end of the pile will not be used as subsoil. This material, approximately 890 cubic yards, will be buried at the bottom of the highwall and covered with at least 2 feet of non-acid-forming material.

With the elimination of this acid-forming material from the subsoil balance the final total for usable subsoil equals 3,378 cubic yards. Paste pH tests will be conducted in the field during reclamation to ensure that no acid-forming materials will be used as a top cover. This field examination will also ensure that all suitable materials will be utilized to their fullest extent.

R647-4-110.5 Soil Redistribution and Revegetation

Soil redistribution depths have been calculated utilizing the known soil volumes in Appendix C and dividing by the areas needing covered. The depth of cover for subsoil material will be approximately six inches over all fill slopes as shown in Figure 110.2-C in the Figures Section. Depth of cover for topsoil resources amounts to only 1 inch over fill slopes. Topsoils stored and

segregated on-site contain ditritus materials mixed within. This vegetative debris should enhance the quality and structure of this material making it a suitable growth medium.

Soil Redistribution

Native overburden removed to mine the humic shale will be used as initial fill to backfill and eliminate, to the extent possible, all highwall areas. During reclamation, this material will be field analyzed to insure material quality. Material that tests with a pH below 6 or above 9 will be buried with at least 2.0 feet of non-toxic material.

As mentioned in the Operation Plan, "A portion of the subsoils are used to create a safety berm around the perimeter of the mine pad." Prior to redistributing the materials in the subsoil pile, the safety berm will be segregated by storing in a location so as not to interfere with backfilling activities. Over the life of the mining operations, these soils established a vegetative cover. Using these soils as a fill closer to the final surface could help in the establishment of final vegetation.

Dozers will be used to push soil materials in place. Initially, all deleterious material will be used as backfill at the bottom of the highwall areas. Fill material will be excavated from the outslope using a track-hoe and placed on the pad area. A dozer will push this material in place over the deleterious material backfilling the highwall and creating the initial contour. Subsoil segregated and stored on-site as well as the safety berm material will be placed at a depth of 6 inches on top of the fill material.

Boulders that have been stored on-site and used during mining operations will be collected and placed randomly on the reclaimed slope. The boulders will be placed in such a way as to mimic the surrounding undisturbed area and create habitat and shelter for small mammals.

After boulder placement, topsoil will be spread adequately to provide a depth of approximately 1 inch of cover. This will be the final contour. Analysis of subsoil and topsoil can be reviewed in Appendix D.

Utilizing a track-hoe, deep gouges will be randomly placed throughout the grade of the final contour. Deep gouges are constructed to retain moisture, minimize erosion and create and enhance wildlife habitat. Seeding will immediately follow the deep gouging process.

Revegetation

Seeding will take place as contemporaneously as is practical following contouring and deep gouging of the area being reclaimed. The seed mixture will be applied by hand broadcasting or by mechanical means. Because of the roughened nature of the seed bed, it is impossible to hand rake the seed to cover the soil. However, by seeding immediately after roughening, the seeds will settle into the voids of the soil. As the soil settles, seeds will be buried.

The Division of Oil, Gas, and Mining suggested the seed mix outlined in Table 2. This seed mix will be applied to all reclaimed surfaces at a rate of approximately 15 lbs/ac.

Table 2: Seed Mix For Rockland Mine Reclamation

Common Name	*Scientific Name*	*Lbs PLS/Acre*
Gardner Saltbrush	*Atriplex gardneri*	*3*
Shadscale	*Atriplex confertifolia*	*2*
Fourwing Saltbrush	*Atriplex canescens*	*2*
Russian Wild Rye	*Elymus juncea*	*4*
Indian Ricegrass	*Oryzopsis hymenoides*	*3*
Kochia	*Kochia prostrata*	*0.5*
	Total	*14.5*

After the seed is applied, the entire area will be hydromulched with a wood fiber or other acceptable mulch. The mulch will be applied at a rate of 2000 lbs./ac. for cover and protection.

Performance Standards for Vegetative Growth

Revegetation will be considered successful when growth has achieved 70 percent of the pre-mining vegetative ground cover. In the case of the Rockland Mine, success standards will be compared to the adjacent undisturbed areas as detailed by the vegetation survey in Appendix E. Vegetation must establish over a period of three years following the last seeding to be considered successful.

When the above standards have been met, the Division will determine that the revegetation work has been satisfactorily completed within practicable limits and approve release of the applied surety or incremental amount thereof.

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R647-4-111 RECLAMATION PRACTICES

As part of reclamation at the Rockland Mine site, the operator commits to conform to the following practices of the R647-4 Rules. If the operator requires a variance to these practices, a request will be made to the Division prior to acting on the variance.

1. Public Safety and Welfare - The operator shall minimize hazards to the public safety and welfare following completion of operations. Methods to minimize hazards shall include but not be limited to:

1.11. The permanent sealing of shafts and tunnels;

1.12. The disposal of trash, scrap metal and wood, buildings, extraneous debris, and other materials incident to mining;

1.13. The plugging of drill, core, or other exploratory holes as set forth in Rule R647-4-108;

1.14. The posting of appropriate warning signs in locations where public access to operations is readily available;

1.15. The construction of berms, fences and/or barriers above highwalls or other excavations when required by the Division.

2. Drainages - If natural channels have been affected by mining operations, then reclamation must be performed such that the channels will be left in a stable condition with respect to actual and reasonably expected water flow so as to avoid or minimize future damage to the hydrologic system.

3. Erosion Control - Reclamation shall be conducted in a manner such that sediment from disturbed areas is adequately controlled. The degree of erosion control shall be appropriate for the site-specific and regional conditions of topography, soil, drainage, water quality or other characteristics.

4. Deleterious Materials - All deleterious or potentially deleterious material shall be safely removed from the site or left in an isolated or neutralized condition such that adverse environmental effects are eliminated or controlled.

5. Land Use - The operator shall leave the on-site area in a condition which is capable of supporting the postmining land use.

6. Slopes - Waste piles, spoil piles and fills shall be regraded to a stable configuration and shall be sloped to minimize safety hazards and erosion while providing for successful revegetation.

7. Highwalls - In surface mining and in open cuts for pads or roadways, highwalls shall be reclaimed and stabilized by backfilling against them or by cutting the wall back to achieve a slope angle of 45 degrees or less.

8. Roads and Pads - On-site roads and pads shall be reclaimed when they are no longer needed for operations. When a road or pad is to be turned over to the property owner or managing agency for continuing use, the operator shall turn over the property with adequate surface drainage structures and in a condition suitable for continued use.

9. Dams and Impoundments - Water impounding structures shall be reclaimed so as to be self-draining and mechanically stable unless shown to have sound hydrologic design and to be beneficial to the postmining land use.

10. Trenches and Pits - Trenches and small pits shall be reclaimed.

11. Structures and Equipment - Structures, rail lines, utility connections, equipment, and debris shall be buried or removed.

12. Topsoil Redistribution - After final grading, soil materials shall be redistributed on a stable surface, so as to minimize erosion, prevent undue compaction and promote revegetation.

13. Revegetation - The species seeded shall include adaptable perennial species that will grow on the site, provide basic soil and watershed protection, and support the postmining land use.

Revegetation shall be considered accomplished when:

13.11. The revegetation has achieved 70 percent of the premining vegetative ground cover. If the premining vegetative ground cover is unknown, the ground cover of an adjacent undisturbed area that is representative of the premining ground cover will be used as a standard. Also, the vegetation has survived three growing seasons following the last seeding, fertilization or irrigation, unless such practices are to continue as part of the postmining land use; or

13.12. The Division determines that the revegetation work has been satisfactorily completed within practical limits.

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R647-4-112 Variance

No variance has been requested by the operator. If a variance is request, the operator will comply with requirements of R647-4-112 and list those variances in this section.

R647-4-113 SURETY

The bond estimate is based upon (a) the technical details of the approved mining and reclamation plan, (b) the proposed post mining land use, and (c) projected third party engineering and administrative costs to cover Division expenses incurred under a bond forfeiture circumstance. Details of the bond estimate for the complete reclamation of the Rockland Mine is found in Appendix I.

Rockland Mine

Appendix A

Blasting Plan

Appendix A

Blasting Plan

All blasting operations will be conducted by persons who have been trained, examined and certified as required by MSHA and other applicable regulations. No resident or owner of a dwelling or structure is located within one-half mile of where surface blasting activity may occur.

All blasting will be conducted between sunrise and sunset. Warning and all-clear signals will be given before and after blasting. Access to the area possible subject to fly rock from blasting shall be regulated. Access to the area shall be blocked until an authorized representative has determined that after blasting no unusual circumstances and that access to and travel in or through the area can be safely resumed.

Records of blasting will be kept on file at the Miracle Rock Mining and Research office in Emery, Utah. The records shall contain the records required by MSHA or the following:

- Name of operator - Rockland Mine
- Location, date, and time of blast
- Name, signature, and license number of blaster in charge
- Temperature, wind directions and approximate velocity
- Type of material blasted
- Number of holes, burden, and spacing
- Diameter and depth of holes
- Types of explosives used
- Total weight of explosives used
- Maximum weight of explosives detonated within any 8-millisecond period
- Maximum number of holes detonated within any 8-millisecond period
- Initiation system
- Type and length of stemming
- If applicable - mats or other protection used
- Type of delay detonator and delay periods used
- Sketch of delay pattern
- Number of persons in blasting crew

Rockland Mine

Appendix B

Soil Survey (NRCS)

Soil Survey, Emery County
Leland D. Sasser , Soil Scientist
USDA Conservation Service
350 North 400 East
Price Utah 84501

In Section 2 T 23.S R.6 E. southeast of Emery there are predominantly 2 soil mapping units, #248 and #131. Unit 131 is on the canyon side slopes and unit 248 is on the flatter ridges and back slopes. In unit 248 there are three soil types that predominate. Travessilla is a shallow or very shallow sandy soil subject to wind erosion on ridges and side slopes under Utah juniper and pinyon trees. The Casmos soil is also shallow to very shallow but is loamy and on lower dryer slopes near shale and rocky areas. The Moffat soil is 40 or more inches to bedrock on nearly level to sloping areas. In map unit 131 it is predominated by Badland (bare shale) and Rock out crop with areas of the Casmos soil.

131 Badland and Rock outcrop Casmos association

Position on landscape: Hillsides of structural benches and cuestas
Slope: 2 to 20 percent
Native plants: Shrubs and grasses
Elevation: 4,200 to 6,500 feet

COMPOSITION

Badland-35 percent
Rock outcrop-20 percent
Camas soil and similar inclustions-20 percent
Site: Desert Shallow Loam (Black Sagebrush)
Contrasting inclusions-25 percent

BADLAND

Badland is steep or very steep nearly barren areas of shale that are dissected by many intermittent drainage channels. Some areas are interbedded with sandstone. Runoff is very rapid and geologic erosion is active.

ROCK OUTCROP

Rock outcrop consists of exposures of bare bedrock in the form of steep and very steep escarpments and ridges. The rock is sandstone, limestone, shale, or siltstone. These areas are mostly barren, though some small depressional areas, cracks, crevices have collected enough soil to support some grasses, shrubs and trees.

CASMOS SOIL

Position on landscape: Ledges and base of slopes of steep hillsides.
Slope features: 2 to 20 percent, shape-concave-convex

Typical profile: Casmos soil #673-21
*0 to 2 inches-light reddish brown channery sandy loam
2* to 5 inches-strong brown loam
5* inches-hard sandstone

Depth class: Shallow (5 to 20 inches)
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Very low
Water supplying capacity: Very low
Potential rooting depth: 5 to 20 inches
Organic matter content of the surface layer: Very low
Runoff: Rapid
Slope length: 10 to 30 feet
Hazard of water erosion: Moderate
Hazard of wind erosion: Slight

INCLUDED AREAS

Contrasting inclusions:

10 percent-deep silty soils under shadscale, galleta, Indian rice grass in draws and basins.

10 percent-very deep sandy soils in canyon floors under fourwing saltbrush, dropseed and sand sagebrush.

5 percent-very deep stony soils on steep slopes under Salina wild rye, shadscale, galleta, and Bigelow brush.

MAJOR USES

Current uses: Rangeland, recreation, and wildlife habitat.

MAJOR MANAGEMENT FACTORS

Soil related factors: Steep slopes with Badland, Rock outcrop and shallow soils.

Climate factors:

Average annual precipitation: 5 to 8 inches
Mean annual air temperature: 48 to 52 degrees F
Frost free period: 140 to 160 days.

RANGELAND

Range site (Casmos soil): Desert Shallow Loam (black sagebrush) D34-118

Composition of the potential plant community: 30 percent grasses, 10 percent forbs, and 60 percent shrubs.
Important plants: black sagebrush, shadscale and galleta.

General management considerations:

Suitability for rangeland seeding is very poor due to low annual precipitation, shallow soils, and occurrence of Badland and Rock outcrop.

Trafficability over unsurfaced roads is very poor. The terrain is rough and broken with steep slopes of Badland and Rock outcrop.

Suitable management practices:

Proper grazing use, a planned grazing system, and proper location of water developments can maintain or improve the rangeland vegetation.

To control erosion from disturbed areas other native plants can be seeded.

INTERPRETIVE GROUPS

Capability classification (Casmos soil): VIIs nonirrigated
Range site: Desert Shallow Loam (Black Sagebrush) D34-118

Other Symbols:

Quads: 505, 506, 507, 551, 552, 585, 586, 592, 593, 626, 627, 632, 633, 673 SWA #'sw

248 – Travessilla-Casmos-Moffat association
S248 23115 acres in Emery County
(51B form #6) 1520 acres in Sevier County

Position on landscape: Cuestas
Slope: 2 to 20 percent
Native plants: Trees shrubs and grasses

COMPOSITION

Travessilla soil and similar inclusion-40 percent
Site: Semi desert shallow loam (Utah juniper-pinyon) D34-233
Casmos soil and similar inclusion-30 percent
Site: Desert shallow loam (Black Sagebrush) D34-118
Moffat soil and similar inclusions-20 percent
Site: Desert sandy loam D34-115
Rock outcrop-20 percent
Contrasting inclusions-10 percent

TRAVESSILLA SOIL

Position on landscape: Cuesta back slopes
Slope features: 2 to 20 percent shape-single to convex

Typical profile: Travessilla soil #629-1
*0 to 3 inches-light brown channery sandy loam
*3 to 14 inches-light brown loam
*14 inches-hard limestone

Depth class: Very shallow to shallow
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: Very low to low
Water supplying capacity: Low
Potential rooting depth: 7 to 20 inches
Organic matter content of the surface layer: Very low
Runoff: Medium
Slope length: 20 to 60 feet
Hazard of water erosion: Moderate
Hazard of wind erosion: Slight

CASMOS SOIL

Position on landscape: Lower portion of cuestas back slopes below the Travessilla soils
Slope features: 2 to 20 percent shape-single to convex
Typical profile: Casmos soil #633-1
*0 to 4 inches-pale brown very channery loam
*4 to 9 inches-pale brown loam
*9 inches-hard sandstone

Depth class: Very shallow to shallow
Drainage class: Moderate
Available water capacity: Very low
Water supplying capacity: Very low
Potential rooting depth: 5 to 20 inches
Organic matter content of the surface layer: Very low
Runoff: Rapid
Slope length: 10 to 30 feet
Hazard of water erosion: Moderate
Hazard of wind erosion: Slight

MOFFAT SOIL

Position on landscape: Base of cuestas
Slope features: 2 to 8 percent, shape-concave

Typical profile: Moffat soil #627-5
*0 to 4 inches-reddish brown fine sandy loam
*4 to 60 inches-reddish brown and yellow red fine sandy loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: Moderate to moderately high
Water supply capacity: Moderately low
Potential rooting depth: Greater than 60 inches
Organic matter content of the surface layer: Very low
Runoff: Slow
Slope length: 20 to 60 feet
Hazard of water erosion: Moderate
Hazard of wind erosion: Severe

ROCK OUTCROP

Rock outcrop consists of bare exposed sandstone. It occurs as cliff and ledges.

INCLUDED AREAS

Contrasting inclusions:
5 percent-very deep stony soils on dip slopes of cuestas and hillsides under shadscale, Salina wild rye and scattered Utah juniper.
5 percent-very deep loamy soils in basins under shadscale and Nuttall saltbush

MAJOR USES

Current uses: Rangeland, recreation and wildlife habitat.

MAJOR MANAGEMENT FACTORS

Soil related factors: Shallow soils
Climate Factors:
Average annual precipitation: 6 to 9 inches
Mean annual air temperature: 45 to 48 degrees F
Frost free period: 110 to 140 days

WOODLAND

Woodland site (Travessilla soil): Semi desert shallow loam (Utah juniper-pinyon) D34-233

Overstory canopy: percent consisting of Utah juniper and pinyon

Composition of the understory vegetation: percent grasses, percent forbs, and percent shrubs

Site index for stated species: for Utah juniper and pinyon
Average productivity:
Average yield per acre: cords
Potential for post or Christmas tree production:

RANGELAND

Range site (Casmos soil): Desert shallow loam (Black Sagebrush) D34-118

Composition of the potential plant community: 30 percent grasses,10 percent forbs and 60 percent shrubs.
Important plants: Black Sagebrush, shadscale, galleta, and Salina wild rye

Range site (Moffat soil): Desert sandy loam D34-115

Composition of the potential plant community: 50 percent grasses, 10 percent forbs and 40 percent shrubs.
Important plants: Galleta, Indian rice grass, shadscale and winterfat.

General management considerations:
Suitability for rangeland seeding is poor due to low annual precipitation and shallow soils.

Trafficability over unsurfaced roads is fair except where cliffs and ledges occur.

Suitable management practices:
Proper grazing use, a planned grazing system and proper location of water developments can maintain or improve the rangeland vegetation.

To control erosion from disturbed areas, prostrate kochia and other native plants can be seeded.

INTERPRETIVE GROUPS

Capability classification (Travessilla soil): VIIs nonirrigated
Range site: Semi desert shallow loam (Utah juniper-pinyon) D34-233

Capability classification (Casmos soil): VIIs nonirrigated
Range site: Desert shallow loam (Black Sagebrush) D34-118

Capability classification (Moffat soil): Nonirrigated
Range site: Desert sandy loam D34-115

Other symbols: CEE2

Quads: 592, 593, 632, 633, 673 SWA #'s

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Rockland Mine

Appendix C

Soil Salvage Summary Table

TABLE I

Topsoil Summary												
Pile #	Latitude	Longitude	Easting (ft)	Northing (ft)	Shape	Est. Height (ft)	Diameter (ft)	Width (ft)	Length (ft)	Top Length (ft)	Volume (ft^3)	Volume (cu.yds)
T1	N38d 50' 48.7"	W111d 12' 45.8"	481539	4299596	Cone[1]	6.00	14.00				496.36	18.38
T2	N38D 50' 54.4"	W111d 12' 36.2"	481770	4299648	Cone	8.00	20.00				1,164.45	43.13
T3	N38d 50' 45.9"	W111d 12' 49.7"	481446	4299510	Wedge[2]	6.00	0.00	15.00	36.00	12.00	1,260.00	46.67
T4	N38d 50' 47.2"	W111d 12' 50.4"	481428	4299552	Cone	12.00	36.00				4,863.04	180.11
T5	N38d 50' 53.2"	W111d 12' 51.3"	481408	4299737	Cone	10.00	25.00				2,123.13	78.63
T6	N38d 510' 51.7"	W111d 12' 56.2"	481289	4299691	Cone	8.00	18.00				980.15	36.30
T7	N38d 50' 52.4"	W111d 12' 57.7"	481253	4299713	Cone	8.00	21.00				1,262.88	46.77
T8	N38d 50' 53.2"	W111d 12' 54.6"	481328	4299736	Wedge	12.00		21.00	39.00	15.00	3,906.00	144.67
T9	N38d 50' 514.1"	W111d 12' 55.0"	481319	4299672	Cone	8.00	30.00				2,337.28	86.57
										Subtotal	18,393.29	681.23
Subsoil Summary												
S1					Wedge	25.00		79.50	150.00	48.00	115,275.00	4,269.44
										Total Usable Soils for Vegetation Growth		5,631.91

[1] Fornula used to estimate volume of cone -- $V=\pi(R^2+rR+r^2)h/3$

[2] Fornula used to estimate volume of wedge -- $V=1/6bh(2a+c)$

Note: Formulas for the geometric shapes were taken from the website http://grapevine.abe.msstate.edu/~fto/tools/vol/index.html

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Appendix D

Soil Sample Analysis

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REPORT DATE
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IDENTIFICATION
ROCKLAND MINE

SOIL ANALYSIS REPORT

INFO SHEET: 43848

LAB NUMBER *0761*	SAMPLE IDENTIFICATION	ORGANIC MATTER Walkley Black Percent Rating	PHOSPHORUS P Olsen (Bray) mg/kg ppm Rating	P Olsen (Bray) lb/A ppm Rating	P Bicarbonate P ppm Rating	POTASSIUM K ppm Rating	MAGNESIUM Mg ppm Rating	CALCIUM Ca ppm Rating	SODIUM Na ppm Rating	pH SOIL pH 1:1	pH BUFFER INDEX	CATION EXCHANGE CAPACITY meq/100g	PERCENT BASE SATURATION (COMPUTED) % K	% Mg	% Ca	% H	% Na
87611	TOPSOIL 1	1.5 VL	2 VL	7 VL	3 VL	208 VH	224 VH	2268 VH		8.5		13.7	3.9	13.6	82.5	0.0	
87612	TOPSOIL 2	1.8 L	5 VL	32 M	6 L	138 M	184 M	2590 VH		8.2		14.8	2.4	10.4	87.2	0.0	
87613	TOPSOIL 3	1.7 L	4 VL	41 H	10 L	197 VH	250 VH	2473 H		8.1		15.0	3.4	13.9	82.7	0.0	
87614	TOPSOIL 4	1.5 VL	3 VL	13 L	4 VL	108 M	187 H	2513 VH		8.3		14.4	1.9	10.8	87.3	0.0	
87615	TOPSOIL 5	2.5 L	4 VL	9 L		84 L	484 VH	2560 H		8.3		17.0	1.3	23.7	75.0	0.0	
87616	SUBSOIL NW	2.1 L	13 L	55 H		95 VL	747 VH	4969 H	234 VH	6.5	6.7	34.9	0.7	17.8	71.2	7.4	2.9
87618	SUBSOIL NE	3.3 M	11 L	30 M		90 VL	974 VH	5753 M	312 VH	5.4	5.8	53.8	0.4	15.1	53.5	28.5	2.5
87619	SUBSOIL SW	3.0 M	11 L	25 M		86 VL	1033 VH	3849 L	296 VH	4.6	4.9	63.9	0.3	13.5	30.1	54.1	2.0
87620	SUBSOIL SE	2.6 M	14 L	34 M		76 VL	1113 VH	4709 VL	428 VH	3.6	4.9	99.0	0.2	9.4	23.8	64.7	1.9
87621	TOPSOIL 9	1.6 L	3 VL	5 VL		90 L	494 VH	2898 H		8.1		18.8	1.2	21.9	76.9	0.0	

LAB NUMBER *0761*	NITRATE-N (NA) SURFACE ppm	SURFACE lbs/A	SURFACE depth in	SUBSOIL 1 ppm	SUBSOIL 1 lbs/A	SUBSOIL 1 depth (ft)	SUBSOIL 2 ppm	SUBSOIL 2 lbs/A	SUBSOIL 2 depth (ft)	Total lbs/A	SULFUR S ppm Rating	ZINC Zn DTPA ppm Rating	MANGANESE Mn DTPA ppm Rating	IRON Fe DTPA ppm Rating	COPPER Cu DTPA ppm Rating	BORON B Hot Water ppm Rating	SOLUBLE SALTS Ec mmhos/cm Rating	
87611			0-6															
87612			0-6															
87613			0-6															
87614			0-6															
87615			0-6															
87616			6-24															
87618			6-24															
87619			6-24															
87620			6-24															
87621			0-6															

REV. 12/03

REPORT
5-3(1-0639
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SOIL ANALYSIS REPORT

LAB NUMBER *66*	SAMPLE IDENTIFICATION	ORGANIC MATTER WALKLEY BLACK percent RATE	PHOSPHORUS P_1 (WEAK BRAY) 1:7 ppm RATE	PHOSPHORUS P_2 (STRONG BRAY) 1:7 ppm RATE	BICARBONATE P ppm RATE	NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE) POTASSIUM K ppm RATE	MAGNESIUM Mg ppm RATE	CALCIUM Ca ppm RATE	SODIUM Na ppm RATE	pH SOIL pH 1:1	pH BUFFER INDEX	CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTE) % K	% Mg	% Ca	% H	% N
62744	N STK PILE	2.6 M	3 VL	45 H		82 VL	889 VH	4587 M	290 VH	6.4	6.6	34.9	0.6	21.2	65.7	8.9	3
62745	S STK PILE	3.1 M	12 L	29 M		64 VL	1052 VH	4028 H	105	3.3	4.7	29.5	0.6	29.7	68.2	0.0	1
62746	TOP SOIL	1.9 L	1 VL	7 VL	3 VL	144 H	231 VH	2014 H	31	8.0		12.5	3.0	15.4	80.5	0.0	1

LAB NUMBER *66*	NITRATE-N (FIA) SURFACE ppm	SURFACE lbs/A	SURFACE depth (in)	SUBSOIL 1 ppm	SUBSOIL 1 lbs/A	SUBSOIL 1 depth (in)	SUBSOIL 2 ppm	SUBSOIL 2 lbs/A	SUBSOIL 2 depth (in)	Total lbs/A	SULFUR S ICAP ppm RATE	ZINC Zn DTPA ppm RATE	MANGANESE Mn DTPA ppm RATE	IRON Fe DTPA ppm RATE	COPPER Cu DTPA ppm RATE	BORON B SORB. DTPA ppm RATE	EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm RATE
62744			0-12															
62745			0-12															
62746			0-12															

The above analytical results apply only to the sample(s) submitted. Samples are retained a maximum of 30 days.

REPORT
5-3(1-0639
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ADDITIONAL SOIL ANALYSIS

LAB NUMBER	SAMPLE IDENTIFICATION	% SAND	% SILT	% CLAY	SOIL TYPE
6662744	N STK PILE	48	30	22	LOAM
6662745	S STK PILE	50	28	22	SANDY CLAY LOAM
6662746	TOP SOIL	74	14	12	SANDY LOAM

Rockland Mine

Appendix E

Vegetation Survey

(Cover Estimates)

Ocular Vegetation Estimate

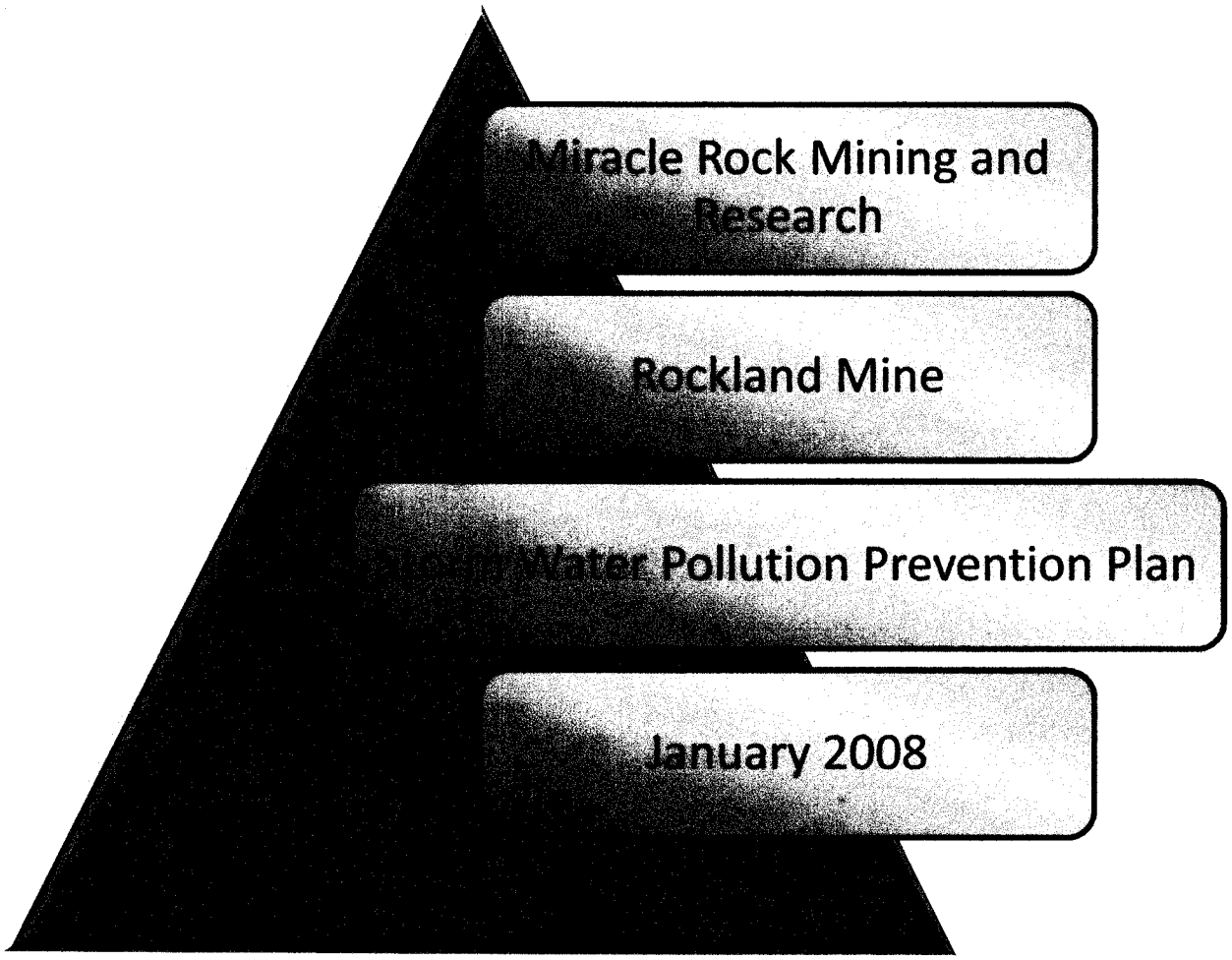
Transect #	Cover Type	%	Transect #	Cover Type	%
#1	Vegetation	0	#11	Vegetation (Grass)	15
	Litter (Dead Mohogany Brush)	20		Litter	0
	Bare Ground	80		Bare Ground	85
	Canopy	0		0% Canopy	0
	1/4" Topsoil			3" Topsoil	
#2	Vegetation	0	#12	Vegetation (Grass)	4
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	96
	Canopy	0		Canopy	0
	1/4" Topsoil			1" Topsoil	
#3	Vegetation	0	#13	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	0		Canopy (Juniper)	50
	1" Topsoil			6" Topsoil	
#4	Vegetation	0	#14	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	0		Canopy (Juniper)	100
	1 1/2" Topsoil			3" Topsoil	
#5	Vegetation	0	#15	Vegetation (Rabbit Brush)	10
	Litter	0		Litter	0
	Bare Ground	20		Bare Ground	80
	Canopy (Pinion)	80		Canopy	10
	3" Topsoil			6 1/2" Topsoil	
#6	Vegetation (Rabbit Brush)	4	#16	Vegetation (Grass)	2
	Litter	0		Litter	0
	Bare Ground	31		Bare Ground	98
	Canopy (Juniper)	65		Canopy	0
	3" Topsoil			3" Topsoil	
#7	Vegetation (Sage Bush)	2	#17	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	18		Bare Ground	40
	Canopy (Juniper)	20		Canopy (Juniper)	60
	3 1/2" Topsoil			1" Topsoil	
#8	Vegetation (Fourwing)	1	#18	Vegetation (Grass)	0.5
	Litter	0		Litter	0
	Bare Ground	99		Bare Ground	99.5
	Canopy	0		Canopy	0
	3" Topsoil			2" Topsoil	
#9	Vegetation (Rabbit Brush)	15	#19	Vegetation (Brigham Tea)	2
	Litter	0		Litter	0
	Bare Ground	85		Bare Ground	98
	Canopy	0		0% Canopy	0
	3" Topsoil			1 1/2" Topsoil	
#10	Vegetation	0	#20	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	100		Canopy	0
	0 " Topsoil			1/4" Topsoil	

Cover Estimates	%
Vegetation (perennial grass, forb and shrub cover)	2.78
Litter	1.00
Bare Ground	81.475
Rock/Rock Fragments	0.00
Canopy	24.25
Total Cover Estimates	**19.62**
Revegetation Requirements (70% of above vegetation figure)	**18.92**

Rockland Mine

Appendix F

Storm Water Pollution Prevention Plan (SWPPP)



Prepared by Dennis Oakley, Consultant

January, 2008

Introduction

According to the storm water regulations in the State of Utah, the Rockland Mine facility falls under Group J (Storm water discharges associated with industrial activity from mineral mining and processing facilities). Requirements from Group J call for operators to develop a storm water pollution prevention plan. This document details the storm water management controls and implementation of such controls

1.0 Pollution Prevention Team

The plan shall identify a specific individual or individuals within the facility organization as members of a Storm Water Pollution Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

Team members include:

Name	Position

2.0 Description of Potential Pollutant Sources

This plan provides a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges of which may result in the discharge of pollutants during dry weather from storm water structures draining the facility. The potential sources of storm water pollution have been identified by in preparation of this plan, which could reasonably be expected to contribute to runoff from the facility. An on-site drainage map of all surface facilities and drainage routes is provided in Appendix A.

2.1 On-Site Drainage

The Drainage Control Map illustrates drainage direction of runoff, drainage control structures and discharge points from all applicable facility-related areas. Culverts, discharges from equipment and maintenance areas subject to storm runoff, locations of existing erosion and sedimentation control structures, receiving streams, locations of fuel

storage tanks, and locations of fueling station areas that are exposed to precipitation are also identified on this map.

2.2 Inventory of Exposed Materials

An inventory of the materials handled at the Rockland Mine that is potentially exposed to precipitation are listed in Table 1. The total inventory includes:

- Description of significant materials that have been handled, stored or disposed in a manner to allow exposure to storm water runoff.
- Method and location of on-site storage or disposal.
- Materials management practices employed to minimize contact of materials with storm water runoff
- The location and description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff
- Description of any treatment the storm water receives

Table 1: Material inventory of potential pollutants at the Rockland Mine Facility.

[illegible]	[illegible] Location	[illegible] Used, Produced, or Stored	[illegible] Contact with Storm Water [illegible]	[illegible]
Diesel Fuel	See Surface Facility Map in Appendix A	500 gallon maximum	med	Secondary Containment
Storage of Oils and Grease	See Surface Facility Map in Appendix A	Varies	low	Oil and grease containers are stored in the storage building
Trash	See Surface Facility Map in Appendix A	Varies	low	Trash removed from site after mining activities

Table 1 above will be updated from time to time to provide an accurate inventory of potential pollutants within the boundaries of the Rockland Mine facility.

2.3 Significant Spills and Leaks

Over the past three (3) years, there have been no significant spills or leaks reported at the Rockland Mine facility. In the event that a significant spill of leak occurs, this section will be updated.

2.4 Sampling Data

No historic sampling data for storm water discharges exist for the Rockland Mine. All future sampling data for the Rockland Mine site will be in accordance with Appendix II.J.5 of the Multi-Sector General Permit for Storm Water Discharges. This data will also be at the mine's main office in Emery, Utah.

2.5 Risk Identification and Summary of Potential Pollutant Sources

This section describes potential pollutant sources which currently exist on the Rockland Mine site. The location of these areas can be found by referencing the Surface Yard Map in Appendix A. These areas have a low risk of adding significant amounts of pollution to storm water discharges since all drainage from these areas are directed into an impoundment structure.

Fueling Facilities – Fueling facilities are located at the portal and ramp platform area. These facilities have a relatively high potential of exposure to storm water runoff even though the diesel fuel tank is fully contained. Spills may occur during refilling of the diesel fuel tank as well as equipment filling procedures unless strict care is taken. Spills of fuel that have contact with the ground will mix with storm water unless cleanup is conducted immediately.

The risk of fuel spills coming into contact with waters of the state is minimal because of the BMP's utilized on-site. BMP's are discussed later in this plan.

Oils and Grease – Oils and grease for equipment maintenance are stored on-site within an enclosed storage building (refer to Surface Facilities Map in Appendix A). As storage of oil has minimal risk of mixing with storm water, maintenance activities on the facilities pad increase the risk. Spilling of oils during these maintenance activities may occur unless strict care is taken. Spills of oil on the ground will mix with storm water unless cleanup is conducted immediately.

Trash – On-site storage of trash occurs only during mining activities. Since mining activities are not continuous at the Rockland Mine, potential for pollutants to come into contact with storm water are limited.

Trash (i.e. empty oil cans and grease tubes, boxes and other miscellaneous garbage) accumulates on the pad area in specified locations. These areas are

exposed to open elements and may mix with storm water during a precipitation event. All trash is removed from the facility and properly disposed of at the completion of all mining activities.

3.0 Measures and Controls

This plan develops a description of storm water management controls appropriate for the Rockland Mine to implement such controls. The appropriateness and priorities of controls in this plan reflect already identified potential sources of pollutants at the facility. A description of the storm water management controls address the following components:

- Good Housekeeping
- Preventive Maintenance
- Spill Prevention and Response Procedures
- Inspections
- Employee Training
- Record-keeping and Internal Reporting Procedures
- Non-storm Water Discharges
- Sediment and Erosion Control
- Management of Runoff

3.1 Good Housekeeping

Good housekeeping requires the maintenance of areas that may contribute pollutants to storm water discharges in a clean, orderly manner. As mentioned above, trash accumulates at specified locations on the mine pad. At the completion of mining activities all trash is disposed of at a certified landfill.

3.2 Preventative Maintenance

A preventive maintenance program involves timely inspection and maintenance of storm water management devices as well as inspecting and testing equipment and systems that may exist to uncover conditions that cause breakdowns or failures resulting in discharges of pollutants to surface waters.

Inspections of BMP's throughout the mine site, such as berms and impoundments, ensure proper diversion and treatment of runoff. If BMP's are found to be inefficient to control and treat runoff, they will be scheduled to be immediately repaired.

3.3 Spill Prevention and Response Procedures

In the case of spills of fuel or oil at the fueling or maintenance areas, the procedures outlined below will be followed.

Spill Prevention – Oil and fuel storage tanks will be inspected periodically for signs of leads, distortion, corrosion, etc. Any problem noted will be documented and scheduled for follow up action.

All tank filling operations will be supervised by qualified personnel to assure spill precaution practices are followed and that response is immediate in the event of a leak or discharge. Spill prevention equipment, such as covers, caps, gaskets, pumps, containment, valves and fittings will be maintained and operated in a manner that will prevent failures, leaks, spills or other incidents that could result in the release of oil.

Employees of Rockland Mine are trained in the spill prevention, maintenance, and response procedures to minimize or eliminate environmental damage as a result of a spill.

Response Procedures – In the case of a spill or release, immediate action should be taken to contain the spill. Containment measures include plugging the leak, diking, putting down absorbent material, digging a trench, closing stop valve, etc. **IT IS OF PRIMARY IMPORTANCE THAT OIL IS NOT ALLOWED TO LEAVE THE SITE AND/OR ENTER ANY WATERWAY.** If the spilled material does leave the company property, immediate efforts must be made to place appropriate absorbent materials in watercourses or drains, to minimize damage.

Clean up of small spills and leaks – Small spills and leaks will be cleaned up with an absorbent material. Once the fuel or oil is confined and absorbed, it will be containerized and disposed of in an appropriate manner off-site.

Clean up of large spills and leaks – Large spills and leaks, such as the spilled contents of the fuel storage tank, will be handled first to contain the spill to the immediate area. On-site equipment may need to be used to construct berms, trenches, or impoundments. Berms or trenches will be constructed to prevent spreading of pollutants. Impoundments will be constructed to confine the liquid for clean up.

Once the liquid is confined and controlled, an absorbent material, such as dirt, will be used to soak up the liquid. Rags, pads, pillows, etc. will be used to clean up all residual traces of the spill. Once all the pollutant has been removed from the surface as best as possible, the ground will be inspected for penetration of pollutants. All materials used to clean up the spill, as well as, contaminated soil will be removed from the site and taken to an approved landfill

3.4 Inspections

Inspections of all storm water control facilities are conducted on a quarterly basis at the Rockland mine. These inspections are conducted to verify the integrity of each structure, ensure erosion is being controlled on all slopes, and to check fueling and oil storage areas and waste disposal areas for evidence of discharges of contaminated storm water.

3.5 Employee Training

Employees will be trained periodically of all components of the storm water pollution prevention plan. Discussions will focus on spill prevention measures, good housekeeping, and spill response procedures. Training of employees will be conducted at least annually. Records of such training are noted in Appendix B.

3.6 Recordkeeping and Internal Reporting Procedures

Records of all spills, discharges, quality and quantity of discharges, inspections and maintenance activities which is conducted on storm water control structures or fueling and oil storage facilities will be maintained in Appendix C These records will be updated annually to ensure a consistent and proactive approach to prevent contamination of storm water discharges.

3.7 Non-Storm Water Discharges

No water sources that could cause a non-storm water discharge exist at the Rockland Mine.

3.8 Sediment and Erosion Control

Sediment control measures have been implemented on the disturbed area to minimize additional contributions of sediment solids to the receiving drainage. Best management practices are used to control erosion and sedimentation from mining operations. BMP's include some of the following controls; berms, impoundments, straw bales, silt fences, etc. Surface water quality will be protected by handling earth materials and runoff in a manner that minimizes the potential for pollution. Specifications for BMP installation are detailed in Appendix D.

Analysis of the stored overburden samples tested has shown that toxic materials (low pH) are present on-site. Discharges if any, of water from areas disturbed by mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for mineral mining promulgated by the EPA set forth in 40CFR Part 434.

3.9 Management of Runoff

As shown on the Drainage Control Map (Appendix A), there are two undisturbed ephemeral drainages adjacent to the disturbed area that could potentially be impacted by runoff from the disturbed area. The drainages are noted as UD-1 and UD-2. Disturbed areas that flow into these drainages are noted on the Map as DA-1 and DA-2. A third ditch, UD-3, is located above the highwall and diverts undisturbed runoff away from the mine site. Each area is discussed below. Runoff volumes from these areas have been calculated and best management practices (BMP's) have been designed accordingly.

Disturbed Area 1 (DA-1)
The mine pad area consists of hydrologic area DA-1. Its size is approximately 3.4 acres. All flow is confined to the pad and impoundment area. Any precipitation that falls onto the mine pad either puddles or flows as indicated by the flow lines on Map R107-1A. Runoff volumes have been calculated for the pad area using a 10 year/24 hour precipitation event of 1.51 inches. Peak discharge from the pad is 0.15 ac/ft.

Disturbed Area 2 (DA-2)
The area below the mine pad where material has been cast off the side slope consists of the hydrologic area DA-2. The material consists mainly of pebble to boulder sized rock and is highly permeable. No erosional effects have been indicated on the surface of these slopes. BMP's will not be used at the toe of the slope until final reclamation.

Undisturbed Drainage (UD-1)
Flow from the mine pad flows into the impoundment located on the east side of the pad. Discharge from the impoundment is treated before flowing into UD-1. Drainage UD-1 drains into an un-named ephemeral drainage which eventually flows into the Muddy River.

Undisturbed Drainage (UD-2)
Overland flows (if any) from the mine pad slopes drain into UD-2. This undisturbed drainage flows directly into the Muddy River drainage system.

Undisturbed Diversion (UD-3)
Ditch UD-3 is a historic diversion ditch that was cut with a bulldozer along an existing road above the mine site. This ditch diverts undisturbed runoff away from the topsoil storage area and directs flow into a natural drainage system. The natural drainage, like others in the area, are ephemeral and flow as a result of precipitation events.

4.0 Comprehensive Site Compliance Evaluation

The site compliance evaluation will provide a basis for evaluating the overall effectiveness of the storm water pollution prevention plan. A comprehensive site compliance evaluation will be conducted at the Rockland Mine at least once annually. Qualified personnel will conduct the comprehensive site inspection to:

- Confirm the accuracy of the description of potential pollutant sources contained in the storm water pollution prevention plan
- Determine the effectiveness of the plan
- Assess compliance with the terms and conditions of the storm water permit

The evaluation will be performed by the Pollution Prevention Team. They may be accompanied by other employees who are familiar with the mining operations and the goals and requirements of the storm water pollution prevention plan.

The process for conducting the site evaluation will include reviewing the plan; developing a list of those items which are part of the material handling, storage, and transfer area covered by the plan; and reviewing the mine's past year operations to determine if any additional areas should be included in the plan. A site inspection will also be conducted to determine if all storm water pollution prevention measures are accurately identified in the plan and that they are in place and working properly. This site inspection should also be conducted during routine inspections to immediately alleviate any future problems caused by storm water runoff.

The results of the comprehensive site compliance evaluation will be documented in a report signed by an authorized company official and retained in Appendix C. The report will summarize the scope of the evaluation, personnel making the evaluation, date of evaluation, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance to Section 3.0 above. The report will be retained as part of the plan for at least three (3) years and will identify any incidents of non-compliance, or a certification that the facility is in compliance with the storm water pollution prevention plan and state permit.

The description of potential pollutant sources and storm water control measures may need to be revised based on the site inspection results of the areas contained in Section 3.0. If necessary, the plan will be revised within two weeks after the date of the inspection. These revisions will be noted in Appendix E. Changes in the control measures will be scheduled for implementation on site in a timely manner.

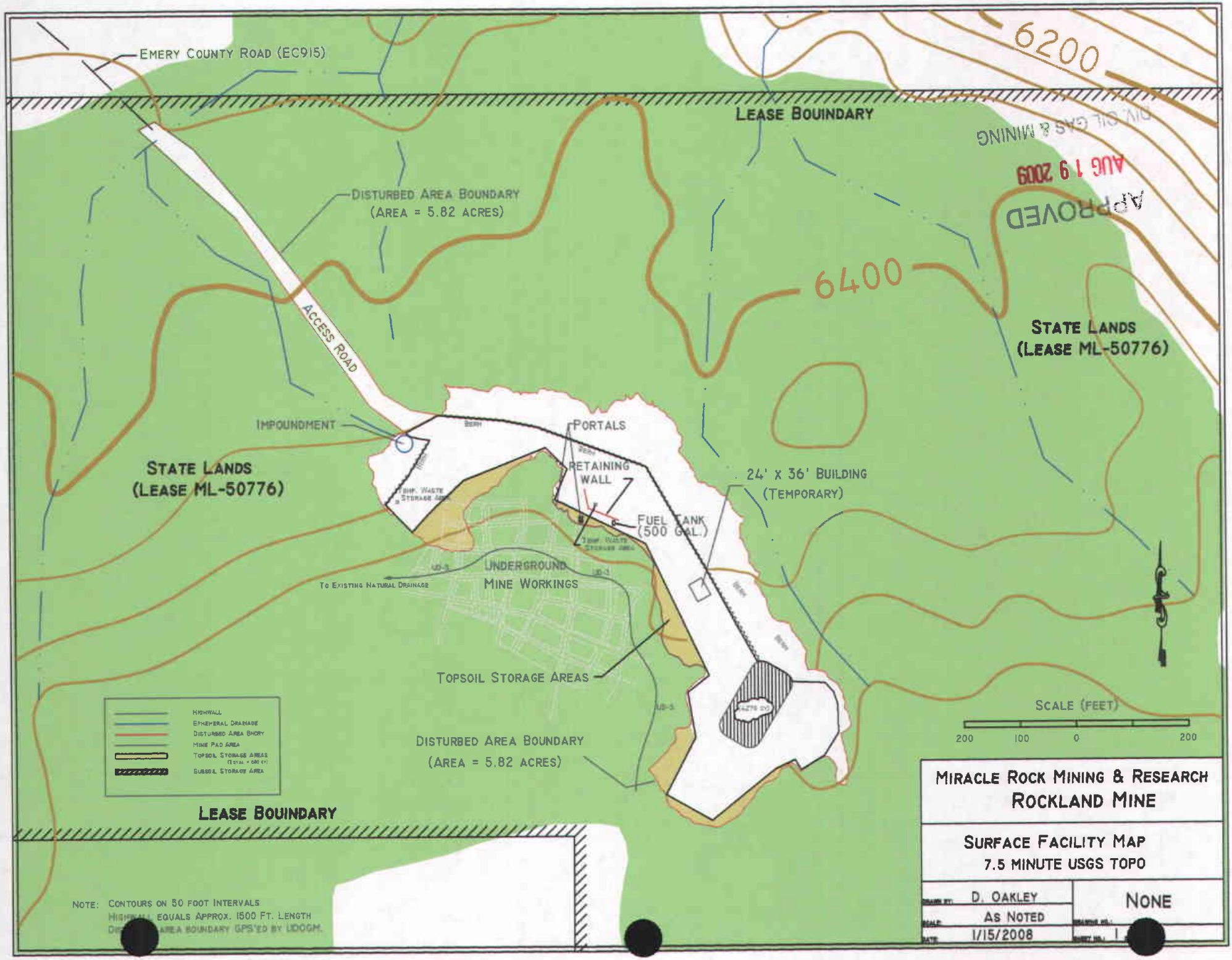
Rockland Mine

Storm Water Pollution Prevention Plan

Appendix A

Surface Facility Map

Drainage Control Map



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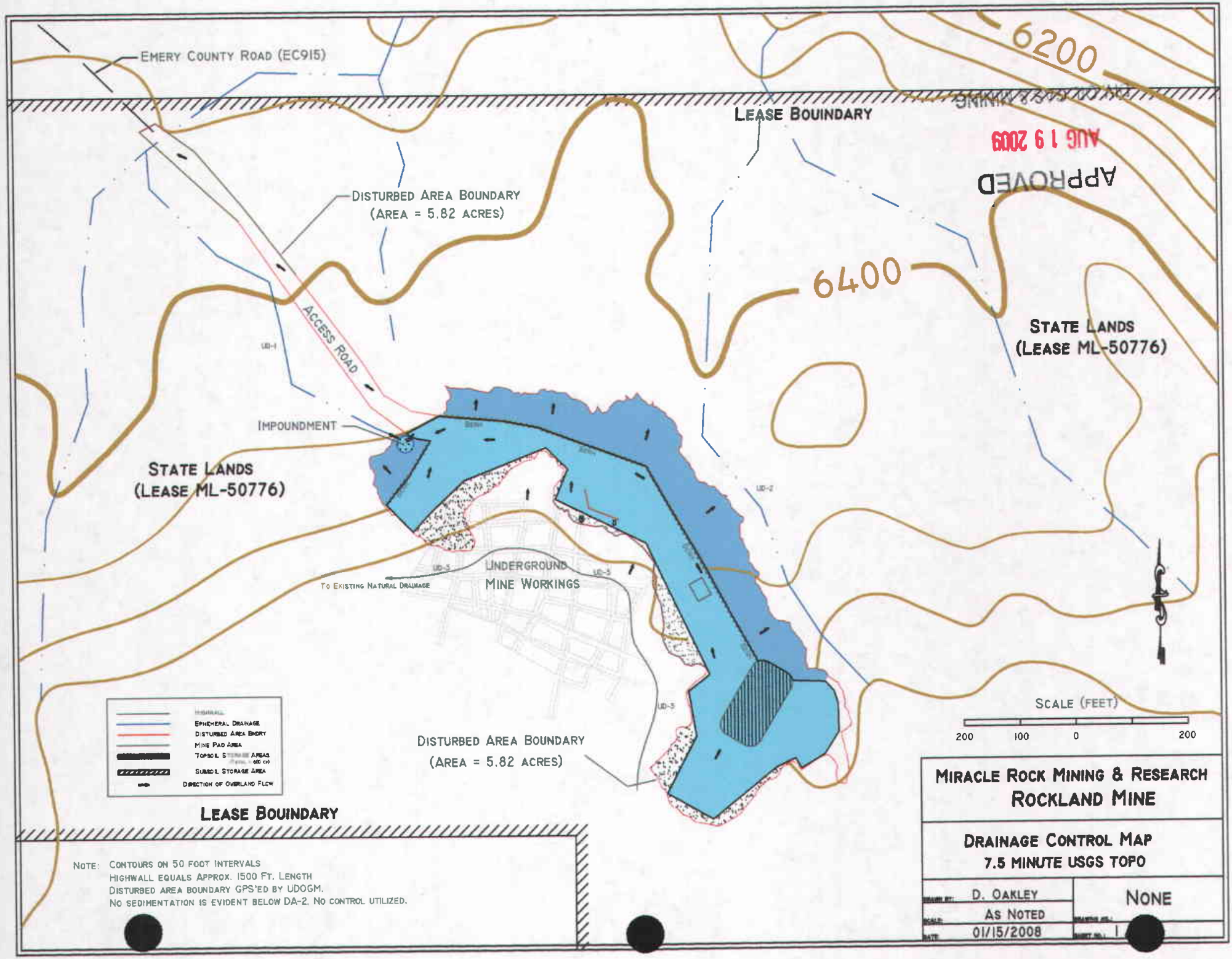
SURFACE FACILITY MAP
7.5 MINUTE USGS TOPO

DRAWN BY:	D. OAKLEY	NONE
SCALE:	AS NOTED	
DATE:	1/15/2008	



NOTE: CONTOURS ON 50 FOOT INTERVALS
HIGHWALL EQUALS APPROX. 1500 FT. LENGTH
DISTURBED AREA BOUNDARY GPS'ED BY UDOGM.
NO SEDIMENTATION IS EVIDENT BELOW DA-2. NO CONTROL UTILIZED.

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MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

DRAINAGE CONTROL MAP
7.5 MINUTE USGS TOPO

DRAWN BY:	D. OAKLEY	NONE
SCALE:	AS NOTED	
DATE:	01/15/2008	SHEET NO.: 1

Rockland Mine

Storm Water Pollution Prevention Plan

Appendix B

Training Records

Storm Water Pollution Prevention Plan
Training Records
Rockland Mine Site

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Rockland Mine

Storm Water Pollution Prevention Plan

Appendix C

Comprehensive Site Evaluation

Comprehensive Site Evaluation

Rockland Mine Site

Date:

Time:

Inspector:

Weather Conditions:

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Rockland Mine

Storm Water Pollution Prevention Plan

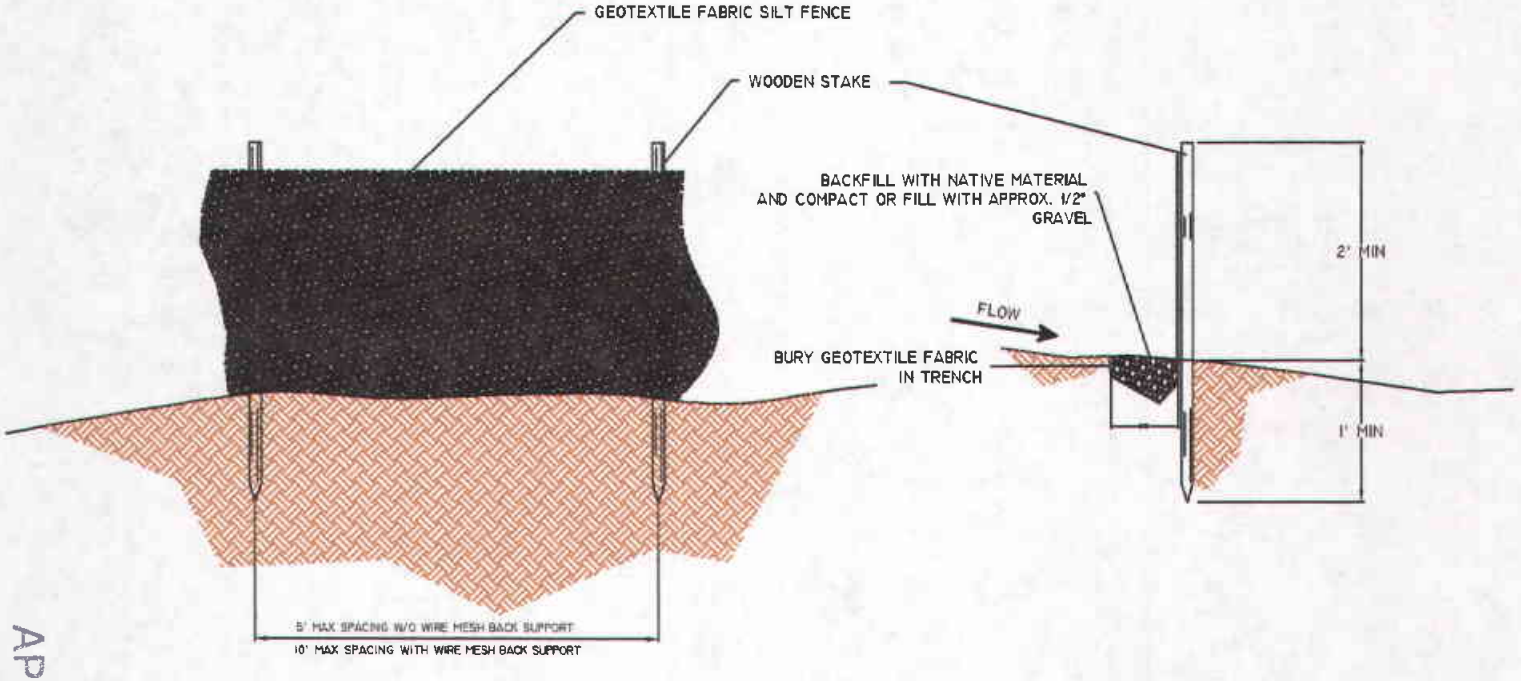
Appendix D

BMP Specifications

NOTES:
INSTALL SILT FENCE ALONG CONTOURS WHEN EVER POSSIBLE

WRAP ENDS SLIGHTLY UP-SLOPE TO PREVENT SEDIMENT FLOWING AROUND ENDS

PERFORM MAINTENANCE MONTHLY AND IMMEDIATELY AFTER STORMS



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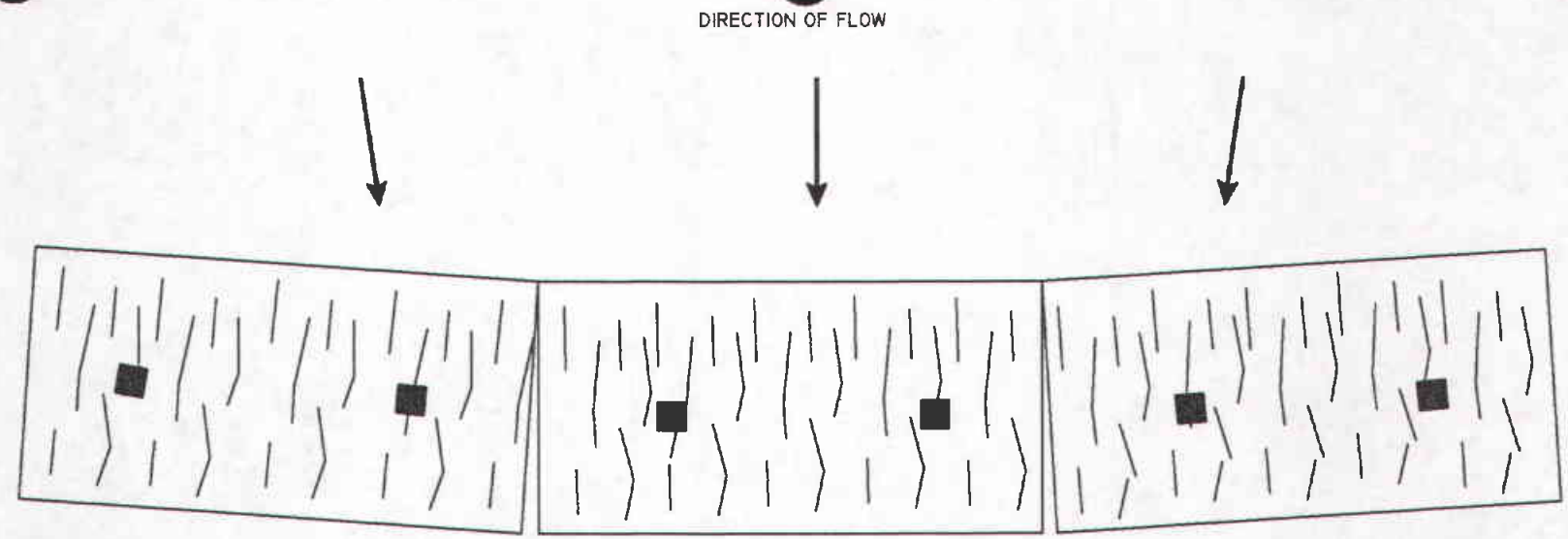
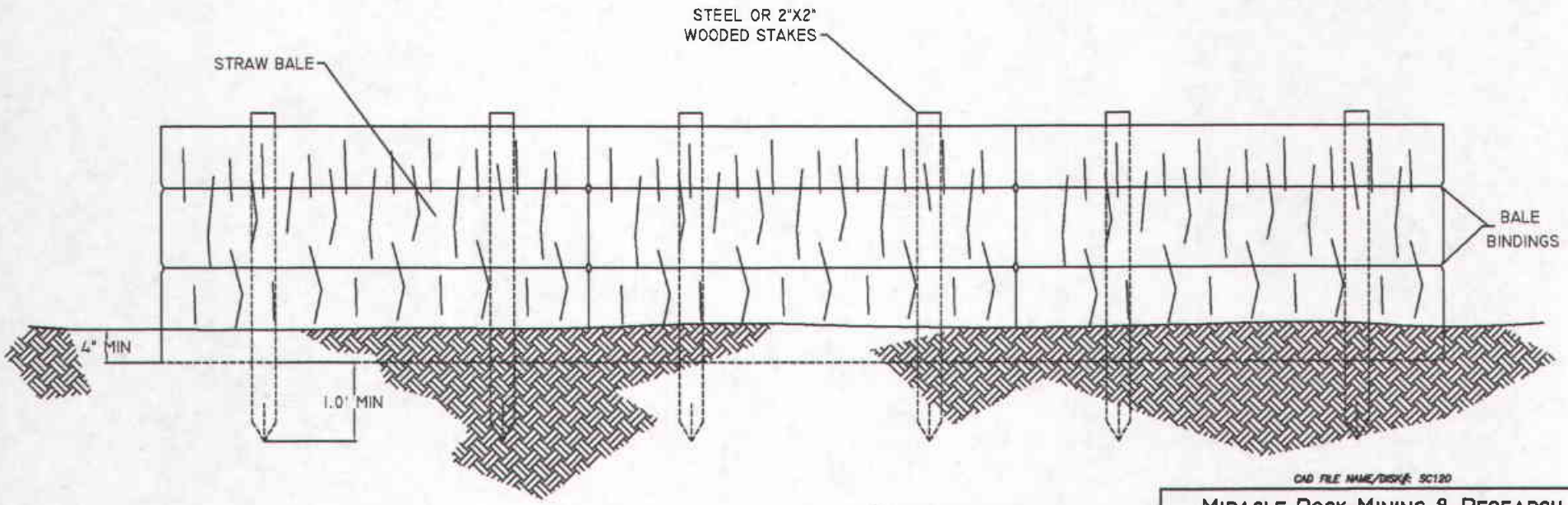
DIV. OIL GAS & MINING

CAD FILE NAME/DISK#: SC110

MIRACLE ROCK MINING & RESEARCH ROCKLAND MINE	
SILT FENCE DETAIL *SWPPP BMP'S* *TYPICAL DRAWING*	
DRAWN BY: *DENNIS OAKLEY*	*SC110*
SCALE: *NONE*	DRAWING #:
DATE: *3/7/2007*	SHEET 1 OF 1 REV.





NOTES:
INSURE TIGHTLY ABUTED ENDS TO ELIMINATE LEAKAGE
KEY BALES INTO GROUND TO PREVENT FLOW UNDER BALES
COMPACT EARTH MATERIAL AROUND BASE OF BALES
USE TWO STAKES PER BALE TO SECURE IN PLACE

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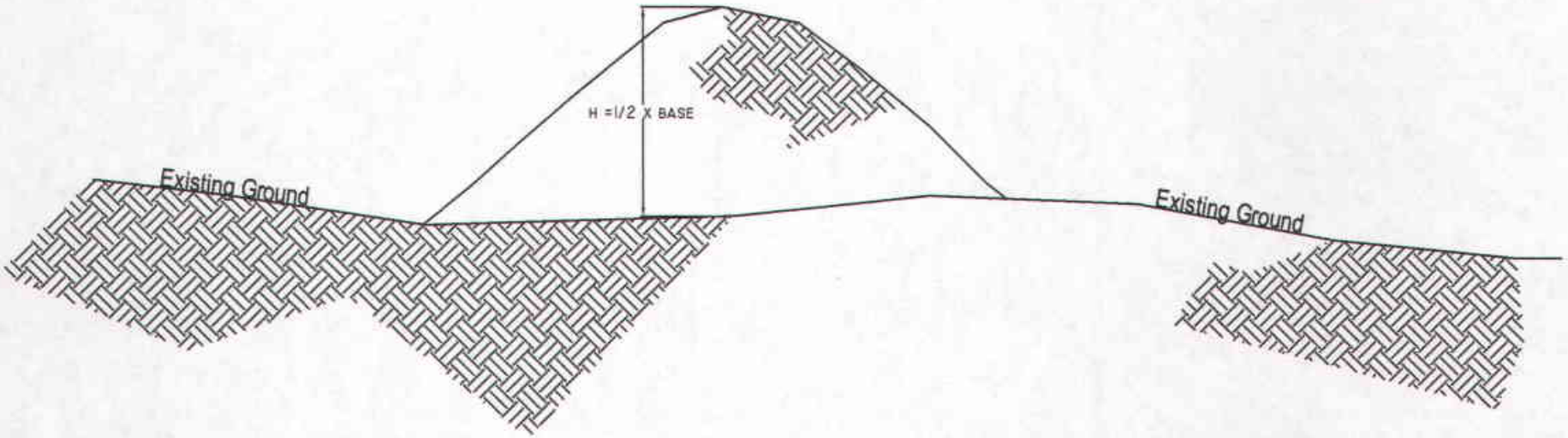
CAD FILE NAME/DISK#: SC120

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

STRAW BALES
SWPPP BMP'S
TYPICAL DRAWING

DRAWN BY:	DENNIS OAKLEY	SC120	
SCALE:	NOT TO SCALE	DRAWING #:	
DATE:	3/7/2007	SHEET 1 OF 1	REV.



NOTES:
HEIGHT EQUALS 1/2 WIDTH OF BASE
BERM IS SLIGHTLY COMPACTED FOR STABILITY
USE FOR SEDIMENT CONTAINMENT

APPROVED
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DIV. OIL GAS & MINING

CAD FILE NAME/DISK#: D202

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

BERM
SWPPP BMP'S
TYPICAL CROSS-SECTION

DRAWN BY:	DENNIS OAKLEY	D202	
SCALE:	NOT TO SCALE	DRAWING #:	
DATE:	3/7/2007	SHEET 1 OF 1	REV.

Rockland Mine

Storm Water Pollution Prevention Plan

Appendix E

Revisions

Storm Water Pollution Prevention Plan
Revision Sheet
Rockland Mine Site

		Approvals*			
Date	**Rev. #**	**1**	**2**	**Pages**	**Comments**

* Approvals- (1) Management (2) Professional Engineer

Rockland Mine

Appendix G

Hydrograph

Project Title = Rockland1

WATERSHED HYDROGRAPH

-- Watershed data for watershed # 1

Curve number = 80.0

Area = 4.0 acres

Hydraulic length = 400.00 feet

Elevation change = 5.0 feet

Concentration time = 0.06 hours

Unit hydrograph type = Forested

-- Total Area = 4.0 acres

-- Storm data

Total precipitation = 2.5 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 1.83 cfs

Discharge volume = 0.29 acre ft

time (hr.)	rainfall (in.)	hydrograph (cfs)	time (hr.)	rainfall (in.)	hydrograph (cfs)
0.00	0.000	0.000 *	0.20	0.005	0.000
0.40	0.005	0.000 *	0.60	0.005	0.000
0.80	0.005	0.000 *	1.00	0.005	0.000
1.20	0.006	0.000 *	1.40	0.006	0.000
1.60	0.006	0.000 *	1.80	0.006	0.000
2.00	0.006	0.000 *	2.20	0.006	0.000
2.40	0.006	0.000 *	2.60	0.006	0.000
2.80	0.006	0.000 *	3.00	0.006	0.000
3.20	0.007	0.000 *	3.40	0.007	0.000
3.60	0.007	0.000 *	3.80	0.007	0.000
4.00	0.007	0.000 *	4.20	0.008	0.000
4.40	0.008	0.000 *	4.60	0.008	0.000
4.80	0.008	0.000 *	5.00	0.008	0.000
5.20	0.008	0.000 *	5.40	0.008	0.000
5.60	0.008	0.000 *	5.80	0.008	0.000
6.00	0.008	0.000 *	6.20	0.010	0.000
6.40	0.010	0.000 *	6.60	0.010	0.000
6.80	0.010	0.000 *	7.00	0.010	0.000

time	rainfall	hydrograph	time	rainfall	hydrograph
(hr.)	(in.)	(cfs)	(hr.)	(in.)	(cfs)
7.20	0.010	0.000 *	7.40	0.010	0.000
7.60	0.010	0.000 *	7.80	0.010	0.000
8.00	0.010	0.000 *	8.20	0.013	0.000
8.40	0.013	0.000 *	8.60	0.013	0.000
8.80	0.014	0.000 *	9.00	0.014	0.000
9.20	0.016	0.000 *	9.40	0.016	0.000
9.60	0.017	0.000 *	9.80	0.018	0.000
10.00	0.018	0.000 *	10.20	0.023	0.000
10.40	0.023	0.000 *	10.60	0.027	0.001
10.80	0.031	0.007 *	11.00	0.031	0.015
11.20	0.048	0.034 *	11.40	0.048	0.056
11.60	0.212	0.316 *	11.80	0.377	1.067
12.00	0.377	1.827 *	12.20	0.071	1.236
12.40	0.071	0.943 *	12.60	0.054	0.885
12.80	0.037	0.777 *	13.00	0.037	0.715
13.20	0.027	0.630 *	13.40	0.027	0.560
13.60	0.024	0.487 *	13.80	0.021	0.406
14.00	0.021	0.337 *	14.20	0.015	0.265

time	rainfall	hydrograph	time	rainfall	hydrograph
(hr.)	(in.)	(cfs)	(hr.)	(in.)	(cfs)
14.40	0.015	0.232 *	14.60	0.015	0.214
14.80	0.015	0.202 *	15.00	0.015	0.193
15.20	0.015	0.187 *	15.40	0.015	0.183
15.60	0.015	0.180 *	15.80	0.015	0.179
16.00	0.015	0.178 *	16.20	0.009	0.152
16.40	0.009	0.137 *	16.60	0.009	0.132
16.80	0.009	0.127 *	17.00	0.009	0.122
17.20	0.009	0.119 *	17.40	0.009	0.116
17.60	0.009	0.113 *	17.80	0.009	0.111
18.00	0.009	0.110 *	18.20	0.009	0.110
18.40	0.009	0.110 *	18.60	0.009	0.110
18.80	0.009	0.110 *	19.00	0.009	0.111
19.20	0.009	0.111 *	19.40	0.009	0.111
19.60	0.009	0.111 *	19.80	0.009	0.112
20.00	0.009	0.112 *	20.20	0.006	0.098
20.40	0.006	0.091 *	20.60	0.006	0.088
20.80	0.006	0.085 *	21.00	0.006	0.083
21.20	0.006	0.081 *	21.40	0.006	0.079

time	rainfall	hydrograph	time	rainfall	hydrograph
(hr.)	(in.)	(cfs)	(hr.)	(in.)	(cfs)
21.60	0.006	0.078 *	21.80	0.006	0.077
22.00	0.006	0.076 *	22.20	0.006	0.076
22.40	0.006	0.076 *	22.60	0.006	0.076
22.80	0.006	0.076 *	23.00	0.006	0.076
23.20	0.006	0.076 *	23.40	0.006	0.076
23.60	0.006	0.076 *	23.80	0.006	0.077
24.00	0.006	0.077 *	24.20	0.000	0.048
24.40	0.000	0.032 *	24.60	0.000	0.026
24.80	0.000	0.020 *	25.00	0.000	0.015
25.20	0.000	0.011 *	25.40	0.000	0.007
25.60	0.000	0.005 *	25.80	0.000	0.002
26.00	0.000	0.001 *	26.20	0.000	0.000
26.40	0.000	0.000 *			

Rockland Mine

Appendix H

Computed Channel Design

STORM -- Version 6.21

General Channel Design

| Title Ephermal Channal |

| Channel Type.....= Triangle |

| Channel Report

| First Side Slope 3.000

| Second Side Slope 3.000

| Flow depth (ft).....= 0.27

| Bed Slope 0.500

| Manning"s n 0.032

| Discharge 1.83

| CFS.....= 1.83

| Cross section area (sqft)..= 0.22

| Hydrualic radius.....= 0.13

| fps.....= 8.36

| Froude number.....= 4.118

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Rockland Mine

Appendix I

Surety Bond Documents

Bond Calculations Rockland Mine			
Direct Costs*			
Subtotal Demolition		0	
Subtotal Earthwork (6.84 ac)	$	70,693.41	
Subtotal Revegetation (6.84 ac)	$	13,703.92	
Direct Costs Total	$	84,397.33	
Indirect Costs			
General Site Clean-Up	$	843.97	1.00%
Contractor Overhead and Profit	$	8,439.73	10.00%
Reclamation Management	$	6,118.81	7.25%
Contingency	$	8,439.73	10.00%
Indirect Costs Total	$	23,842.25	
2008 Total Costs	$	108,239.58	
Escalation Factor			3.80%
Number of Years			5
Escalation	$	22,189.03	
2013 Reclamation Costs for Rockland Mine	$	130,428.61	

* Refer to the RM-110 reclamation map series and Figures 110.2-A through 110.2-E for bond estimation.

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Means Unit Cost

Line Number	Equipment	Crew	Daily Output	Labor Hours	Unit	Material	Labor	Equip	Total	Total Incl O&P
01 54 36.50.0100	Mob/Demob Dozer (for 50 mi RT)	B-34K	3	2.667	EA		$ 61.00	$110.00	$171.00	$ 217.00
01 54 36.50.0020	Mob/Demob Excavator (for 50 mi RT)	B34N	4	2	EA		$ 81.50	$207.00	$288.50	$ 355.00
01 54 36.50.2500	For each additional 5 miles distance (70 mi RT)						10%	10%		
31 2316.46.5020	300 hp Dozer, Common Earth, 100' Haul	B-10M	1650	0.007	BCY		$ 0.27	$ 0.84	$ 1.11	$ 1.34
31 2316.42.0300	Excavating, Common Earth, 3 yd Bucket	B-12D	2080	0.008	BCY		$ 0.27	$ 1.12	$ 1.39	$ 1.66
31 3713.10.0200	Riprap, machine placed for slope protectino	B-12G	62	0.258	LCY	26.5	$ 9.20	$ 10.35	$ 46.05	$ 55.00

Estimated Costs

Item	Quantity	Unit	Costs
Mob/Demob	4	EA	$ 3,308.40
Dozer	32,705.60	BCY	$ 36,303.22
Excavator @ 25% of Total Quantity	8,176.40	BCY	$ 11,365.20
Riprap	500	LCY	$ 23,025.00
Total			$ 70,693.41

Seeded Area 6.84 acres

Pocking

This cost is added to the excavating cost in the earthwork. No additional cost here.

Seed Mix for Rockland Mine

Common Name	Scientific Name	lbs/ac	$/lb	$/ac	Amount
Gardner Saltbrush	*Atriplex gardneri*	3	$ 13.00	$ 39.00	$ 266.76
Shadscale	*A. confertifolia*	2	$ 10.50	$ 21.00	$ 143.64
Fourwing Saltbrush	*A. canescens*	2	$ 5.00	$ 10.00	$ 68.40
Russian Wildrye	*Elymus juncea*	4	$ 2.75	$ 11.00	$ 75.24
Indian Ricegrass	*Oryzopsis hymenoides*	3	$ 9.00	$ 27.00	$ 184.68
Kochia	*Kochia prostrata*	0.5	$ 5.00	$ 2.50	$ 17.10
	TOTALS	14.5	$ 45.25	$ 110.50	**$ 755.82**

Hydromulch

						2008 Bare Costs				
Line Number	**Equipment**	**Crew**	**Daily Output**	**Labor**	**Unit**	**Material**	**Labor**	**Equipment**	**Total**	**Total Incl O&P**
32 92.19.0200	Synthetic Erosion Control, Soil Sealent, Sprayed from Truck	B-81	80		0.3 MSF	$ 26.50	$ 10.05	$ 6.90	$ 43.45	$ 52.00

Estimated Costs

Item	Quantity	Unit	Total
Pocking	6.84 (added with earthwork)	AC	$ -
Seed	6.84	AC	$ 755.82
Hydromulch	298	MSF	$ 12,948.10
	TOTAL		**$ 13,703.92**

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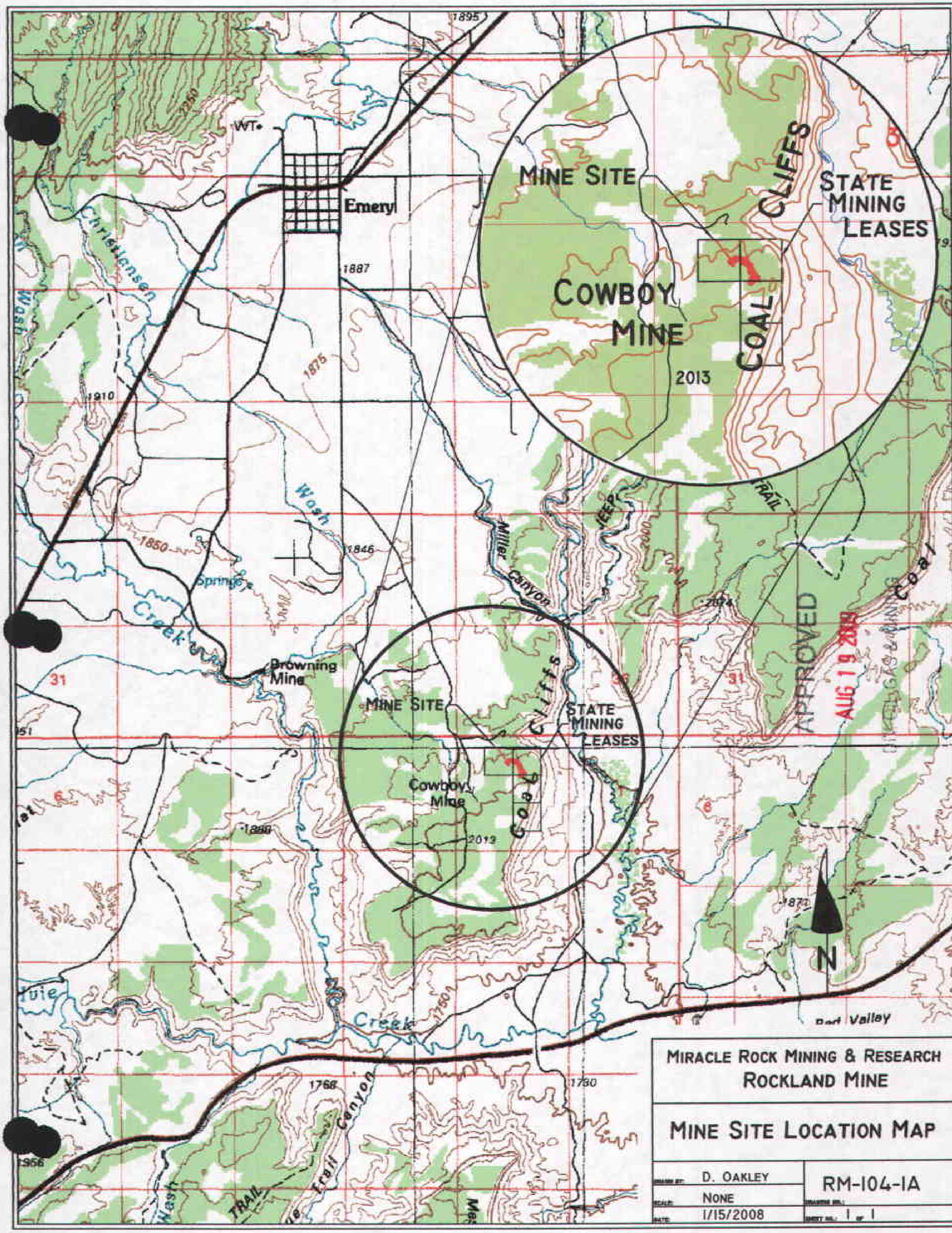
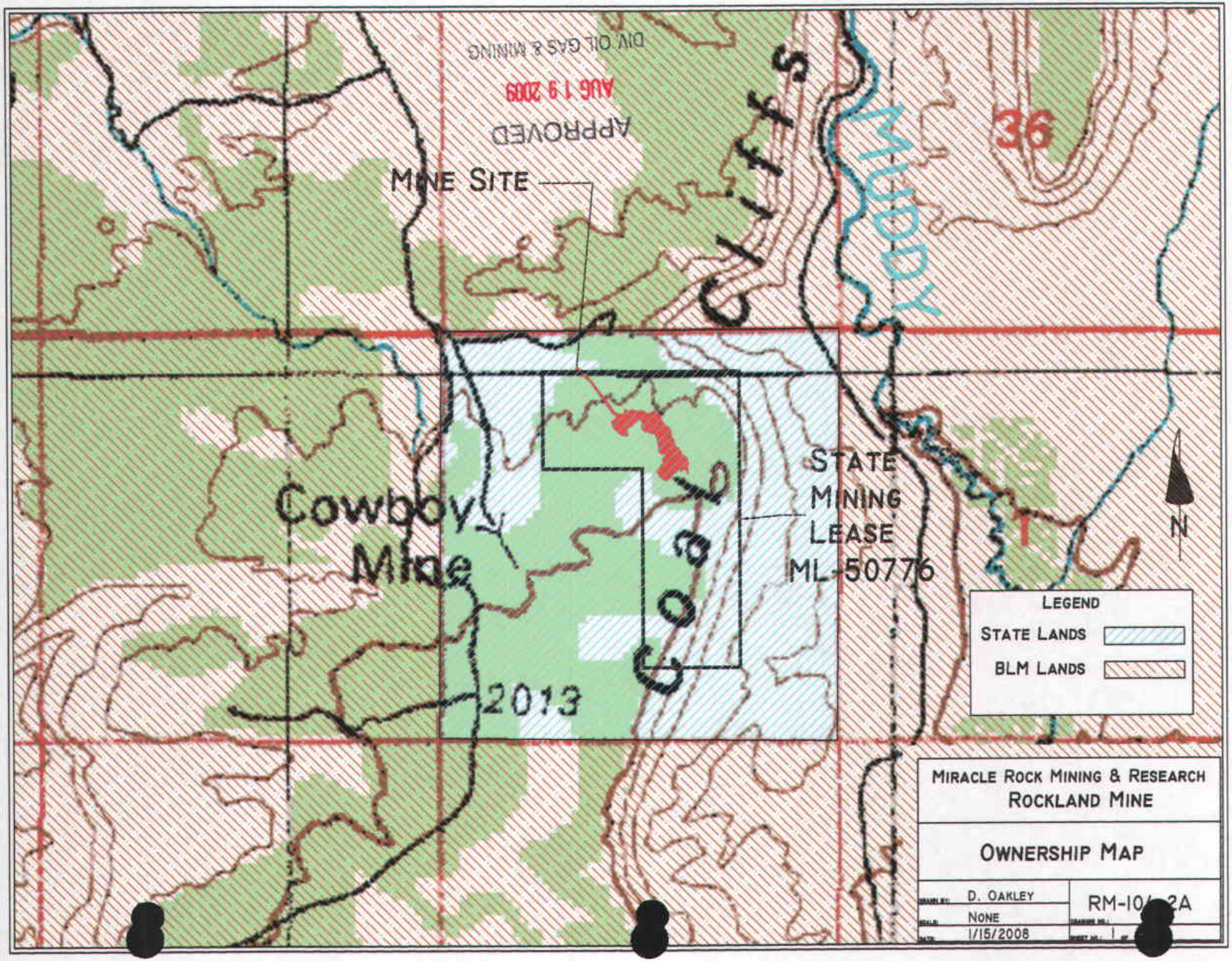
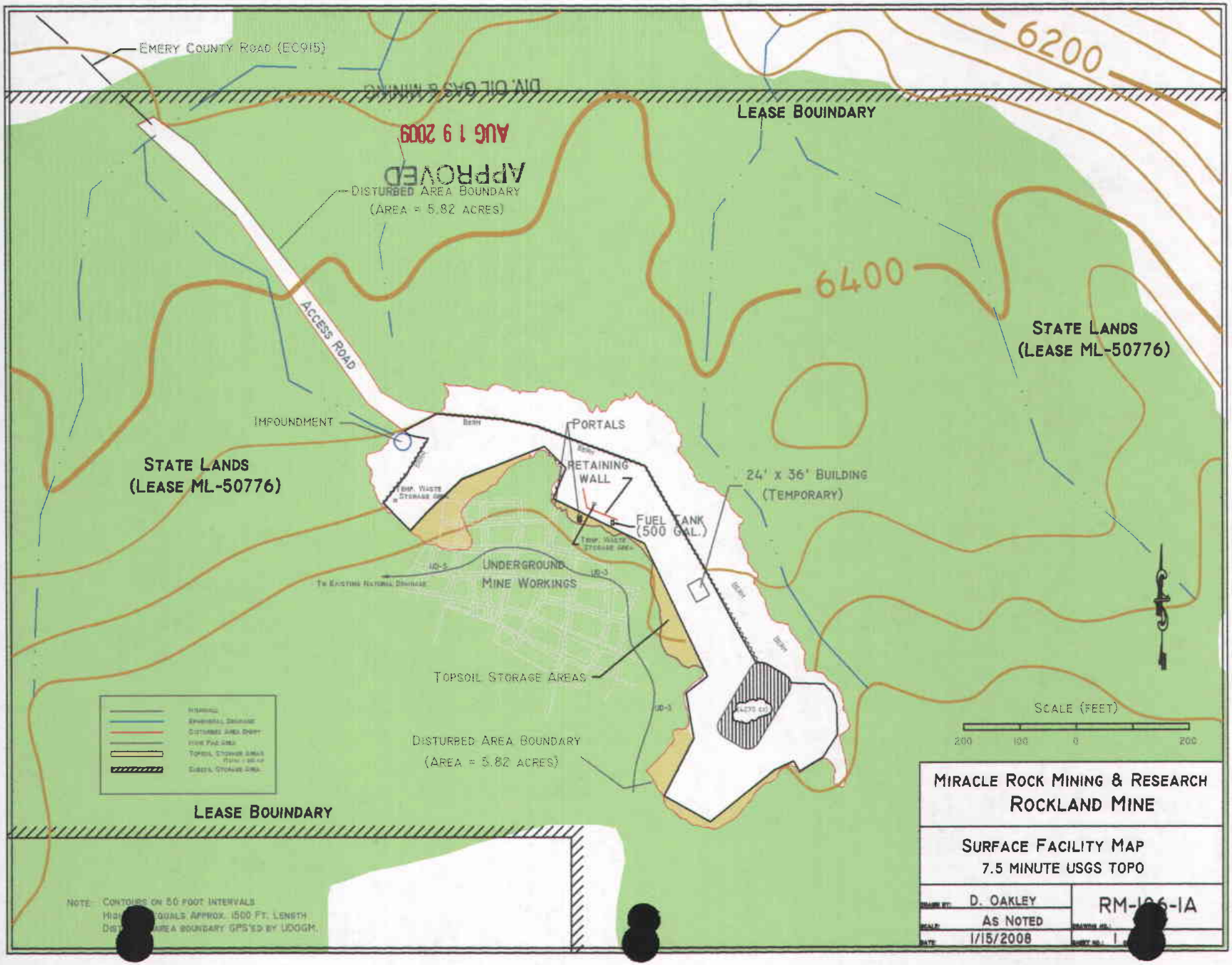


MINE SITE
CLIFFS
STATE MINING LEASES
COWBOY MINE
COAL
2013
Emery
WT.
1895
1887
1875
1910
1850
1846
Christiansen
Wash
Miller Canyon
Spring
Creek
Browning Mine
31
6
MINE SITE
Cliffs
STATE MINING LEASES
Cowboy Mine
Coal
2013
1888
JEEP
TRAIL
2074
Coal
APPROVED
AUG 19 2008
N
1873
Red Valley
Creek
1750
1768
1730
Canyon
Trail
TRAIL
Wash
1956
MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE
MINE SITE LOCATION MAP
D. OAKLEY
NONE
1/15/2008
RM-104-1A
1 of 1


DIV OIL GAS & MINING
AUG 19 2009
APPROVED
MINE SITE
Cowboy Mine
2013
STATE MINING LEASE ML-50776
MUDDY
36
T
N
LEGEND
STATE LANDS
BLM LANDS
MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE
OWNERSHIP MAP
D. OAKLEY
NONE
1/15/2008
RM-10-2A


EMERY COUNTY ROAD (EC915)
6200
LEASE BOUINDARY
DISTURBED AREA BOUNDARY
(AREA = 5.82 ACRES)
6400
ACCESS ROAD
STATE LANDS
(LEASE ML-50776)
IMPOUNDMENT
PORTALS
RETAINING WALL
24' x 36' BUILDING
(TEMPORARY)
FUEL TANK
(500 GAL.)
UNDERGROUND
MINE WORKINGS
TOPSOIL STORAGE AREAS
STATE LANDS
(LEASE ML-50776)
DISTURBED AREA BOUNDARY
(AREA = 5.82 ACRES)
LEASE BOUINDARY
SCALE (FEET)
200
100
0
200
MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE
SURFACE FACILITY MAP
7.5 MINUTE USGS TOPO
D. OAKLEY
AS NOTED
1/15/2008
RM-106-1A
NOTE: CONTOURS ON 50 FOOT INTERVALS
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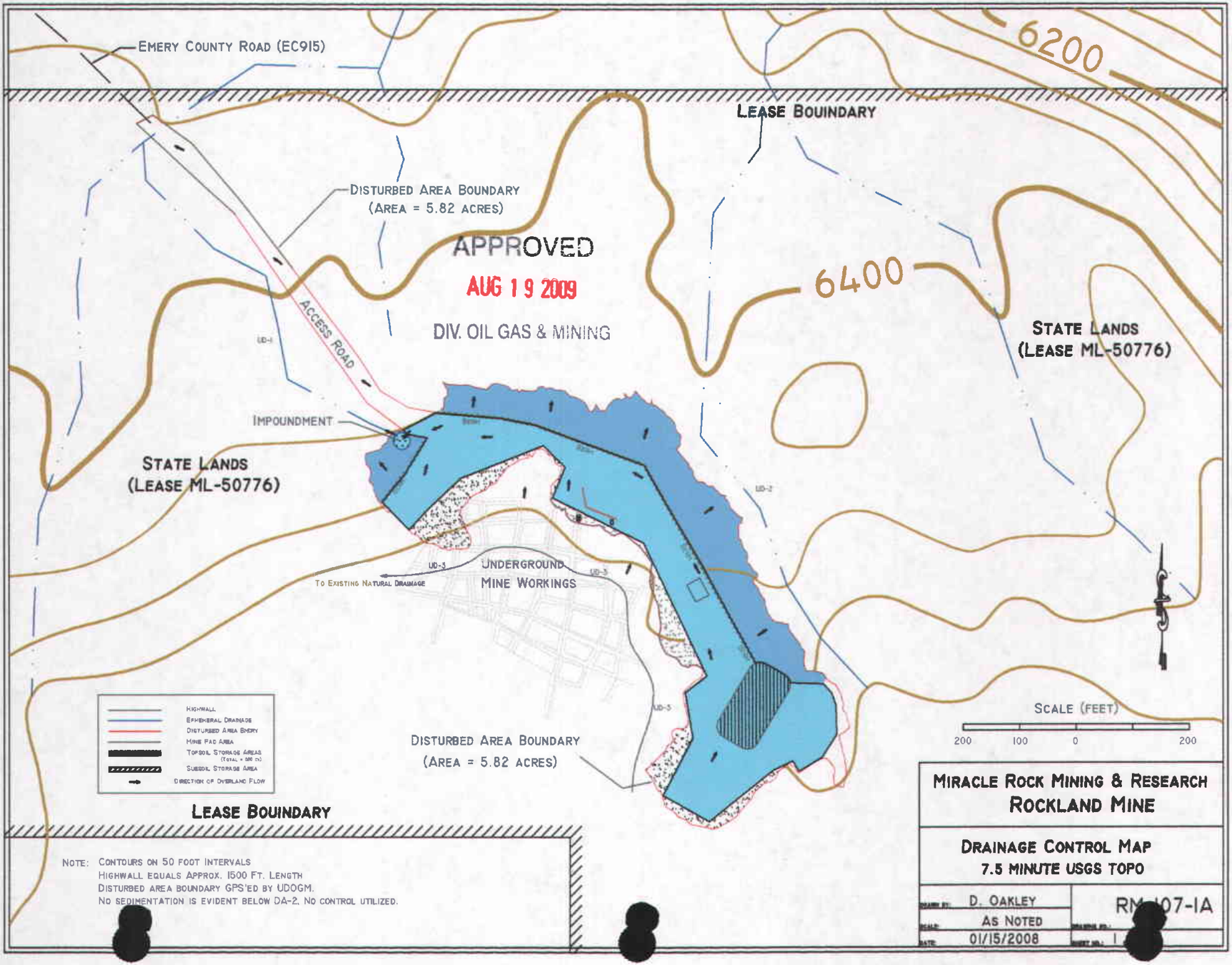
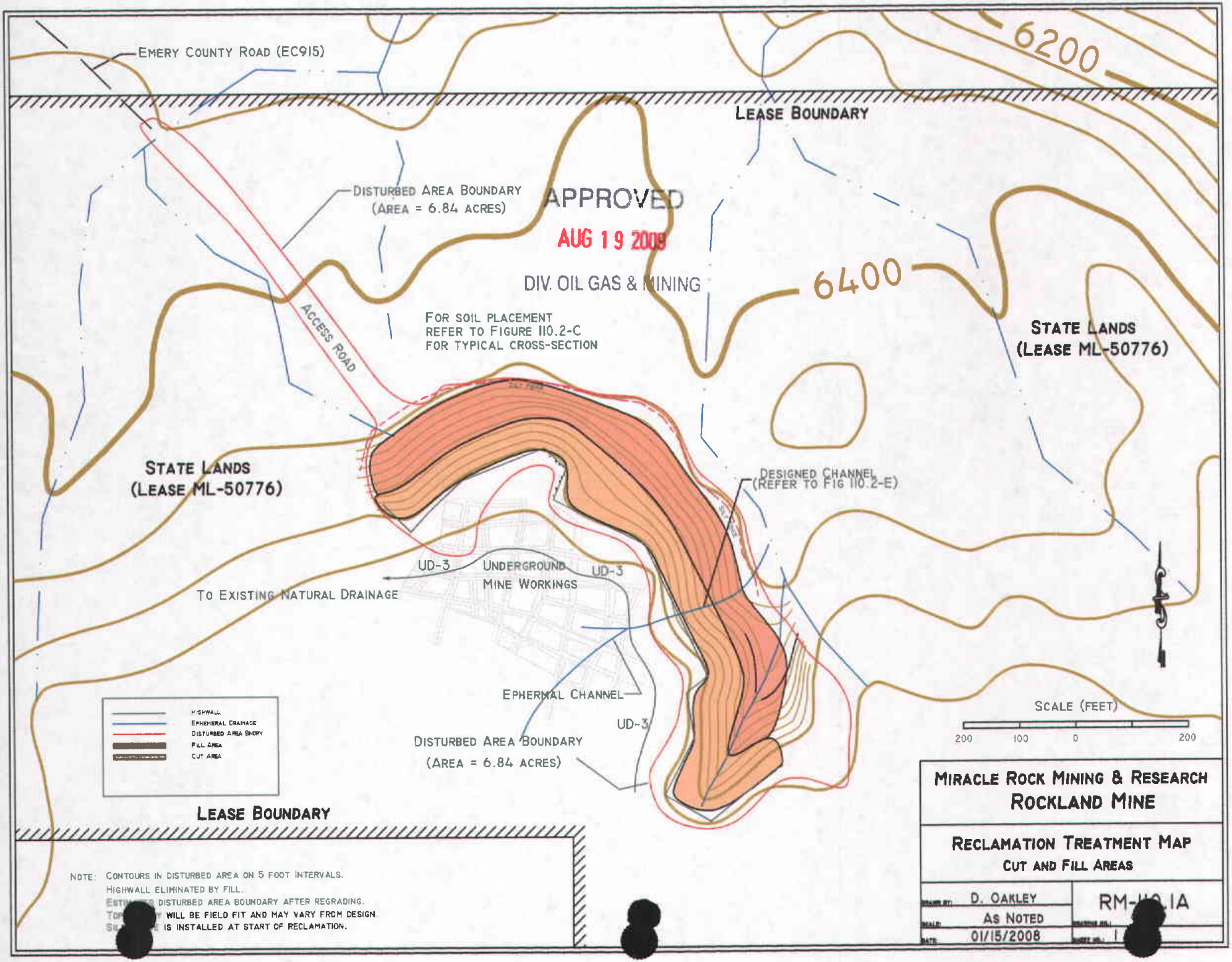


NOTE: CONTOURS ON 50 FOOT INTERVALS
HIGHWALL EQUALS APPROX. 1500 FT. LENGTH
DISTURBED AREA BOUNDARY GPS'ED BY UDOGM.
NO SEDIMENTATION IS EVIDENT BELOW DA-2. NO CONTROL UTILIZED.

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

DRAINAGE CONTROL MAP
7.5 MINUTE USGS TOPO

DRAWN BY: D. OAKLEY	RM-107-1A
SCALE: AS NOTED	DRAWING NO.:
DATE: 01/15/2008	SHEET NO.: 1

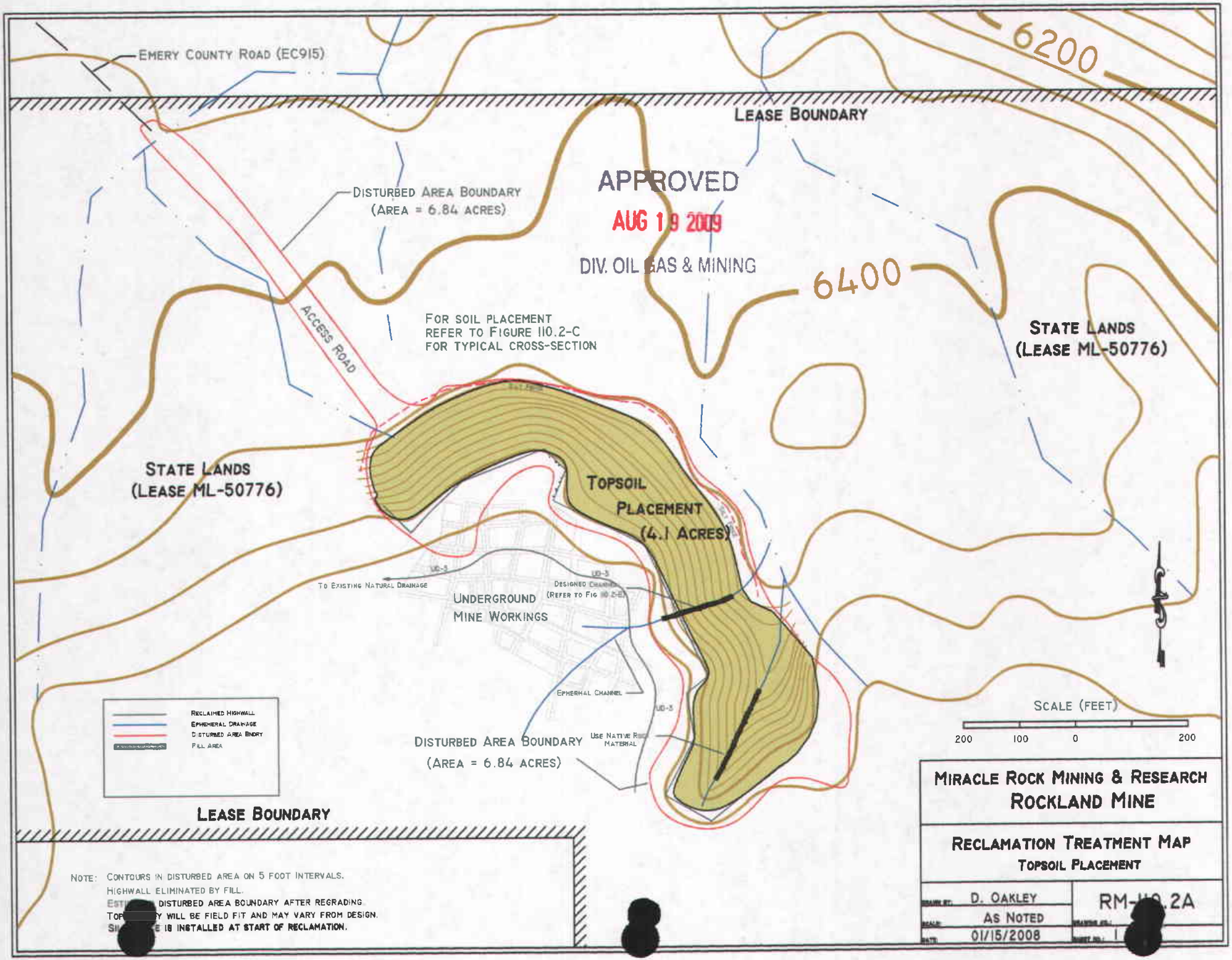


NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
ESTI[illegible] DISTURBED AREA BOUNDARY AFTER REGRADING.
TOP[illegible] WILL BE FIELD FIT AND MAY VARY FROM DESIGN.
SIL[illegible] IS INSTALLED AT START OF RECLAMATION.

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

RECLAMATION TREATMENT MAP
CUT AND FILL AREAS

DRAWN BY: D. OAKLEY	RM-[illegible].1A
SCALE: AS NOTED	DRAWING NO.:
DATE: 01/15/2008	SHEET NO.: 1

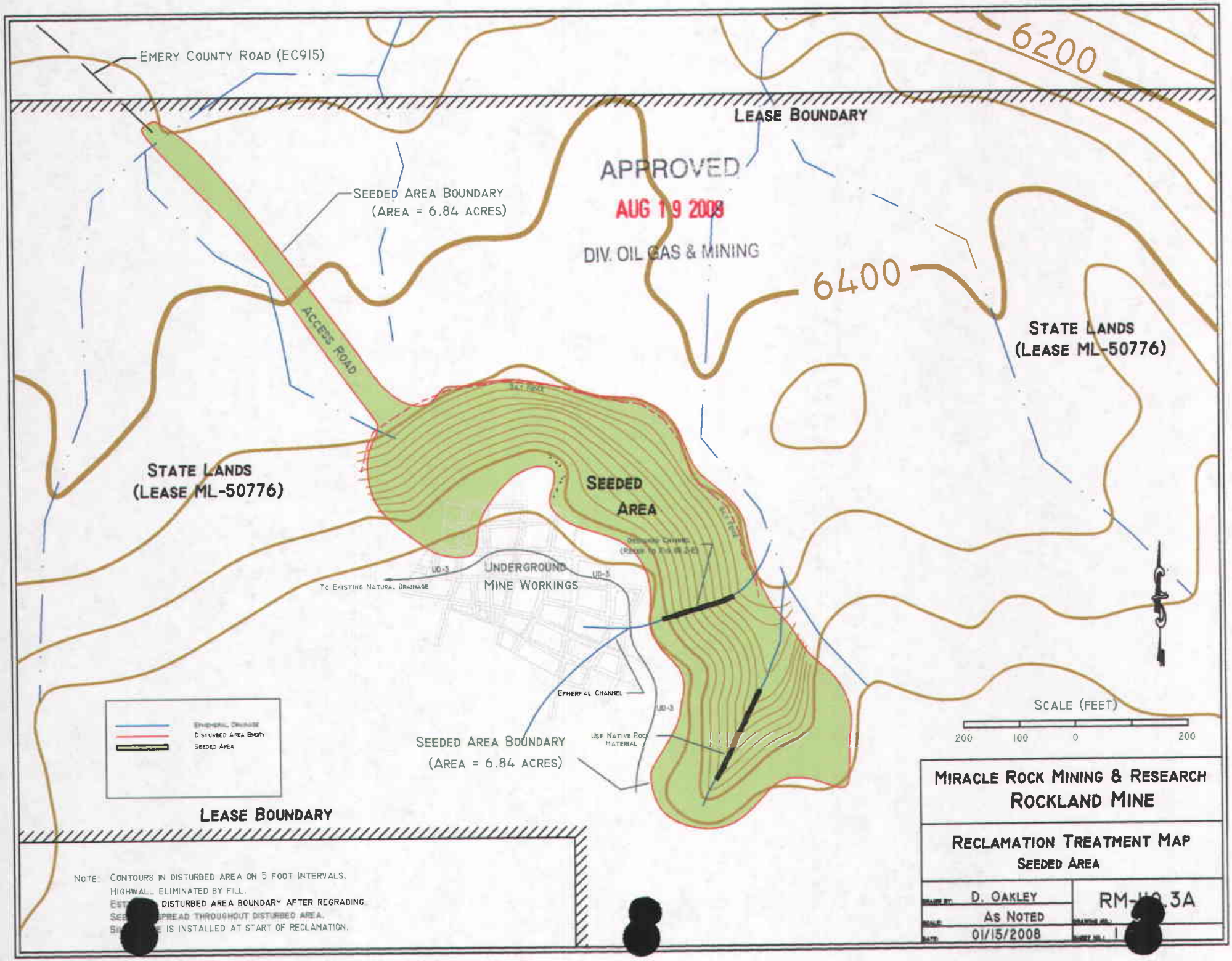


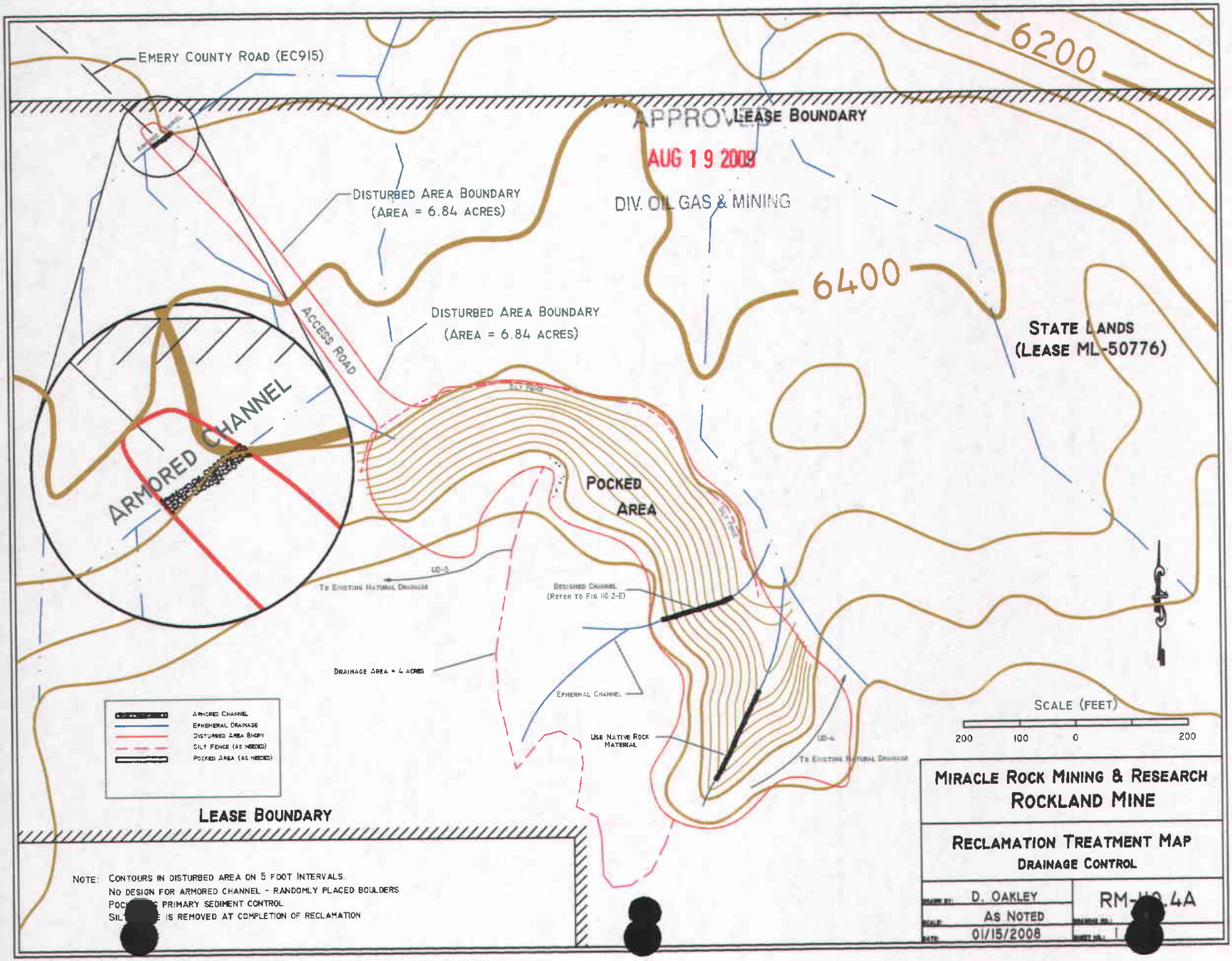
NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
ESTI[illegible] DISTURBED AREA BOUNDARY AFTER REGRADING.
TOP[illegible]Y WILL BE FIELD FIT AND MAY VARY FROM DESIGN.
SI[illegible]E IS INSTALLED AT START OF RECLAMATION.

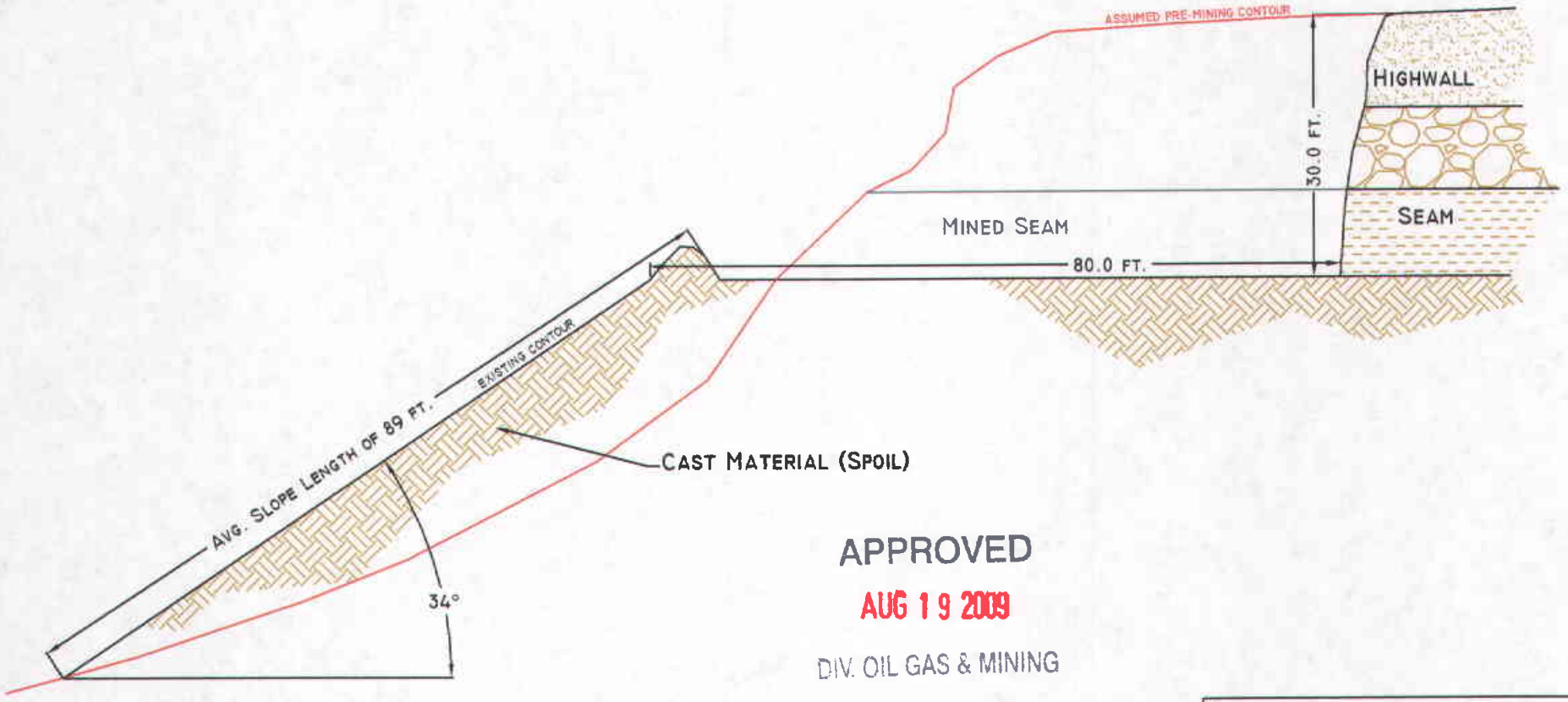
MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

RECLAMATION TREATMENT MAP
TOPSOIL PLACEMENT

DRAWN BY: D. OAKLEY	RM-[illegible].2A
SCALE: AS NOTED	
DATE: 01/15/2008	SHEET NO.: 1


EMERY COUNTY ROAD (EC915)
6200
LEASE BOUNDARY
APPROVED
AUG 19 2008
DIV. OIL GAS & MINING
SEEDED AREA BOUNDARY
(AREA = 6.84 ACRES)
ACCESS ROAD
6400
STATE LANDS
(LEASE ML-50776)
STATE LANDS
(LEASE ML-50776)
SEEDED
AREA
UD-3
TO EXISTING NATURAL DRAINAGE
UNDERGROUND
MINE WORKINGS
UD-5
EPHERMAL CHANNEL
UD-3
USE NATIVE ROCK
MATERIAL
SEEDED AREA BOUNDARY
(AREA = 6.84 ACRES)
DISTURBED AREA BNDRY
SEEDED AREA
SCALE (FEET)
200
100
0
200
LEASE BOUNDARY
NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
DISTURBED AREA BOUNDARY AFTER REGRADING
SPREAD THROUGHOUT DISTURBED AREA.
IS INSTALLED AT START OF RECLAMATION.
MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE
RECLAMATION TREATMENT MAP
SEEDED AREA
D. OAKLEY
AS NOTED
01/15/2008
RM-UD.3A
1


EMERY COUNTY ROAD (EC915)
6200
LEASE BOUNDARY
APPROVED
AUG 19 2008
DIV. OIL GAS & MINING
DISTURBED AREA BOUNDARY
(AREA = 6.84 ACRES)
6400
DISTURBED AREA BOUNDARY
(AREA = 6.84 ACRES)
ACCESS ROAD
STATE LANDS
(LEASE ML-50776)
ARMORED CHANNEL
POCKED
AREA
SILT FENCE
SILT FENCE
UD-3
TO EXISTING NATURAL DRAINAGE
DESIGNED CHANNEL
(REFER TO FIG 110.2-E)
DRAINAGE AREA = 4 ACRES
EPHERMAL CHANNEL
USE NATIVE ROCK
MATERIAL
UD-4
TO EXISTING NATURAL DRAINAGE
ARMORED CHANNEL
EPHEMERAL DRAINAGE
DISTURBED AREA BNDRY
SILT FENCE (AS NEEDED)
POCKED AREA (AS NEEDED)
SCALE (FEET)
200
100
0
200
LEASE BOUNDARY
NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
NO DESIGN FOR ARMORED CHANNEL - RANDOMLY PLACED BOULDERS
POCKED AREAS PRIMARY SEDIMENT CONTROL
SILT FENCE IS REMOVED AT COMPLETION OF RECLAMATION
MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE
RECLAMATION TREATMENT MAP
DRAINAGE CONTROL
DRAWN BY: D. OAKLEY
SCALE: AS NOTED
DATE: 01/15/2008
RM-M9.4A
DRAWING NO.:
SHEET NO.: 1



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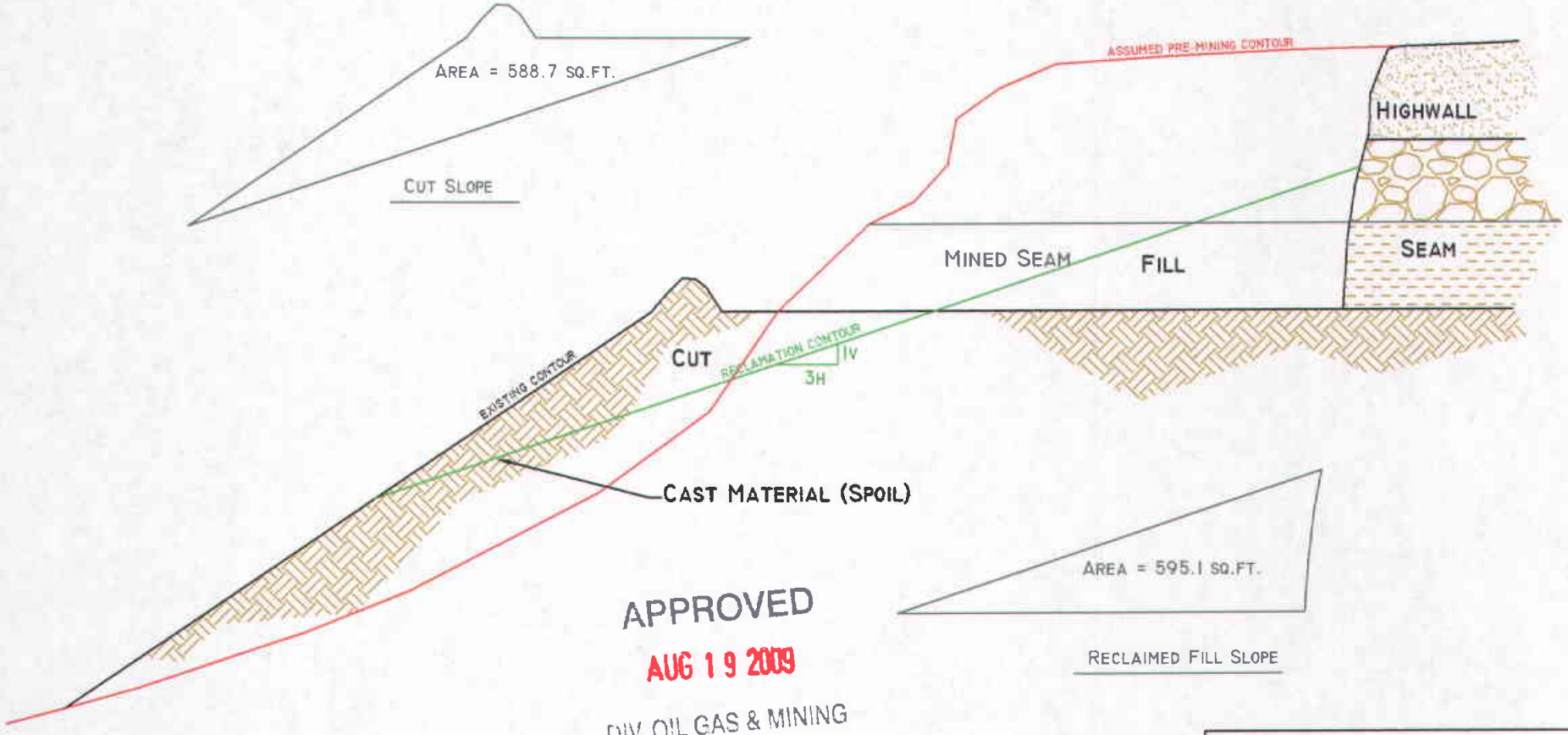
NOTE: TYPICAL CROSS-SECTION - LENGTHS AND DISTANCES MAY VARY.
PRE-MINING CONTOUR IS ASSUMED BASED ON ADJACENT TOPOGRAPHY.
MEASURED LENGTH OF HIGHWALL IS 1500 FT.
CAST MATERIAL ORIGINATED FROM ABOVE MINED SEAM

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

TYPICAL CROSS-SECTION
MINE PAD AND HIGHWALL

DRAWN BY:	D. OAKLEY	FIG. 110.2-A
SCALE:	NONE	DRAWING NO.:
DATE:	01/15/2008	SHEET NO.: 1 OF 1



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NOTE: TYPICAL CROSS-SECTION - LENGTHS AND DISTANCES MAY VARY.
PRE-MINING CONTOUR IS ASSUMED BASED ON ADJACENT TOPOGRAPHY.
MEASURED LENGTH OF HIGHWALL IS 1500 FT.
CAST MATERIAL ORIGINATED FROM ABOVE MINED SEAM

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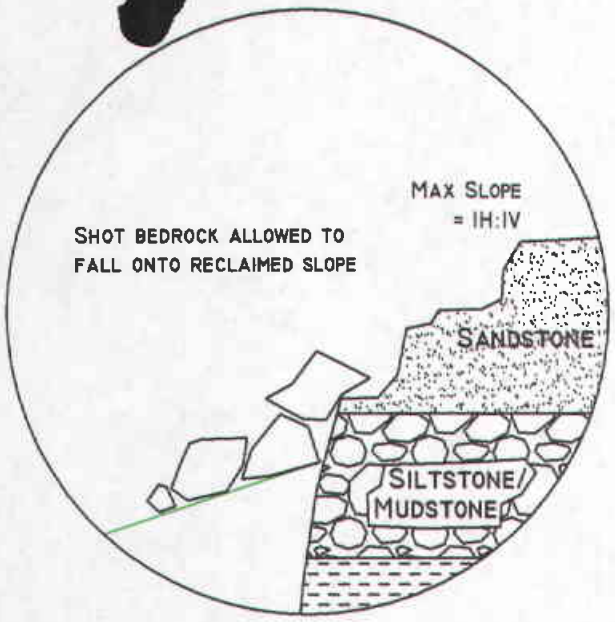
ROCKLAND MINE

TYPICAL CROSS-SECTION
SOIL VOLUME CALCULATION AREAS

DRAWN BY:	D. OAKLEY	FIG. 110.2-B
SCALE:	NONE	DRAWING NO.:
DATE:	01/15/2008	SHEET NO.: 1 OF 1



DETAIL A

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DETAIL B

NOTE: TYPICAL CROSS-SECTION - LENGTHS AND DISTANCES MAY VARY.
PRE-MINING CONTOUR IS ASSUMED BASED ON ADJACENT TOPOGRAPHY.
MEASURED LENGTH OF HIGHWALL IS 1500 FT.
CAST MATERIAL ORIGINATED FROM ABOVE MINED SEAM

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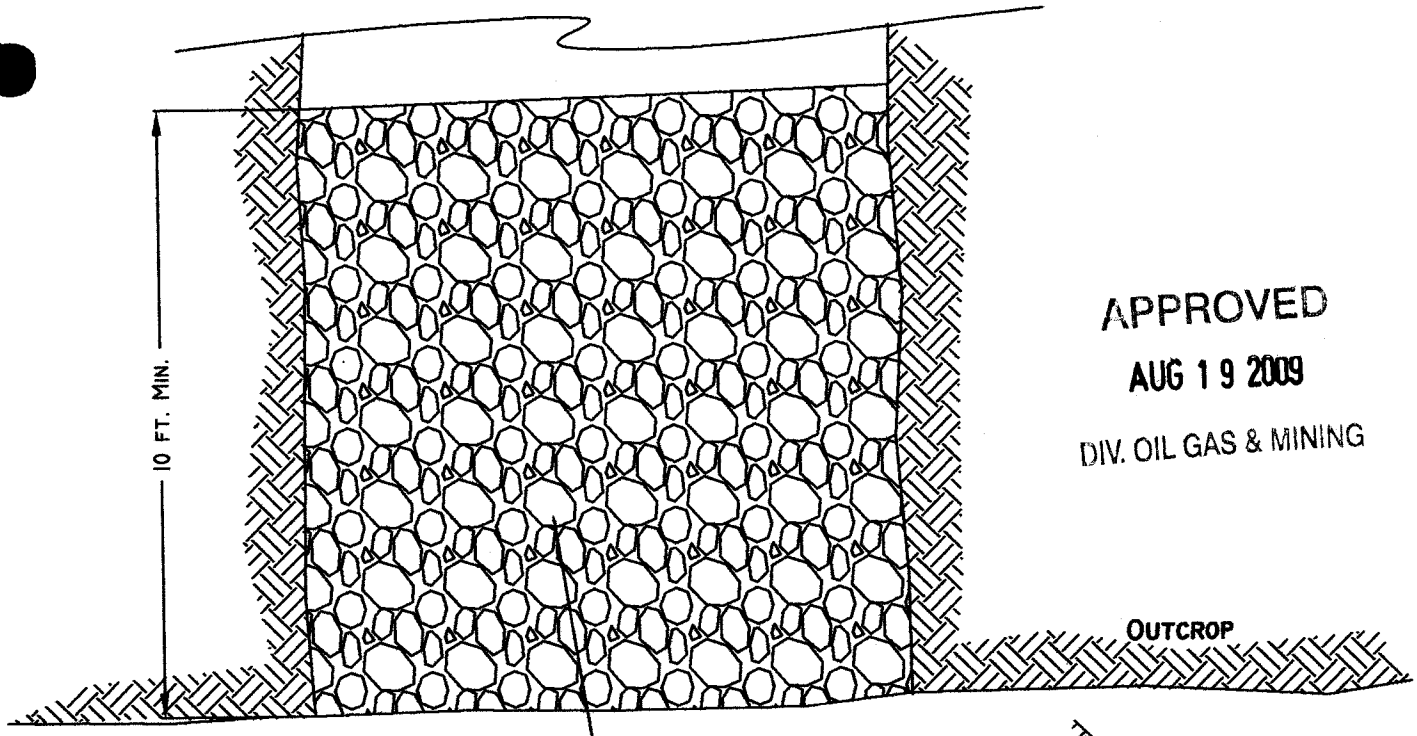
ROCKLAND MINE

TYPICAL CROSS-SECTION
RECLAIMED SLOPE - FINAL CONTOUR

DRAWN BY: D. OAKLEY	FIG. 110.2-C
SCALE: NONE	DRAWING NO:
DATE: 01/15/2008	SHEET NO: 1 OF 1



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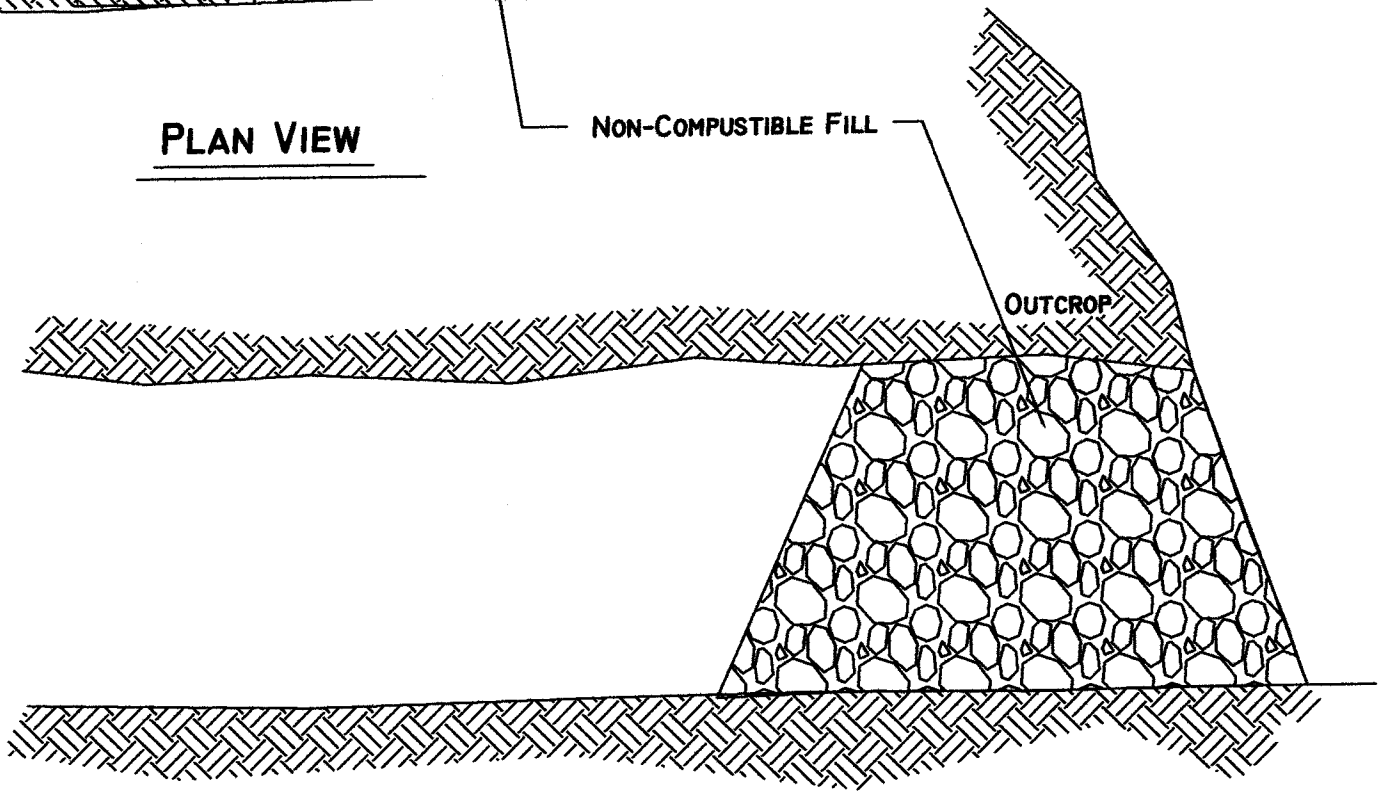
PLAN VIEW



ELEVATION VIEW

NOTE: FILL MATERIAL WILL PLUG PORTAL COMPLETELY AND EXTEND A MINIMUM OF 10 FEET INBYE.

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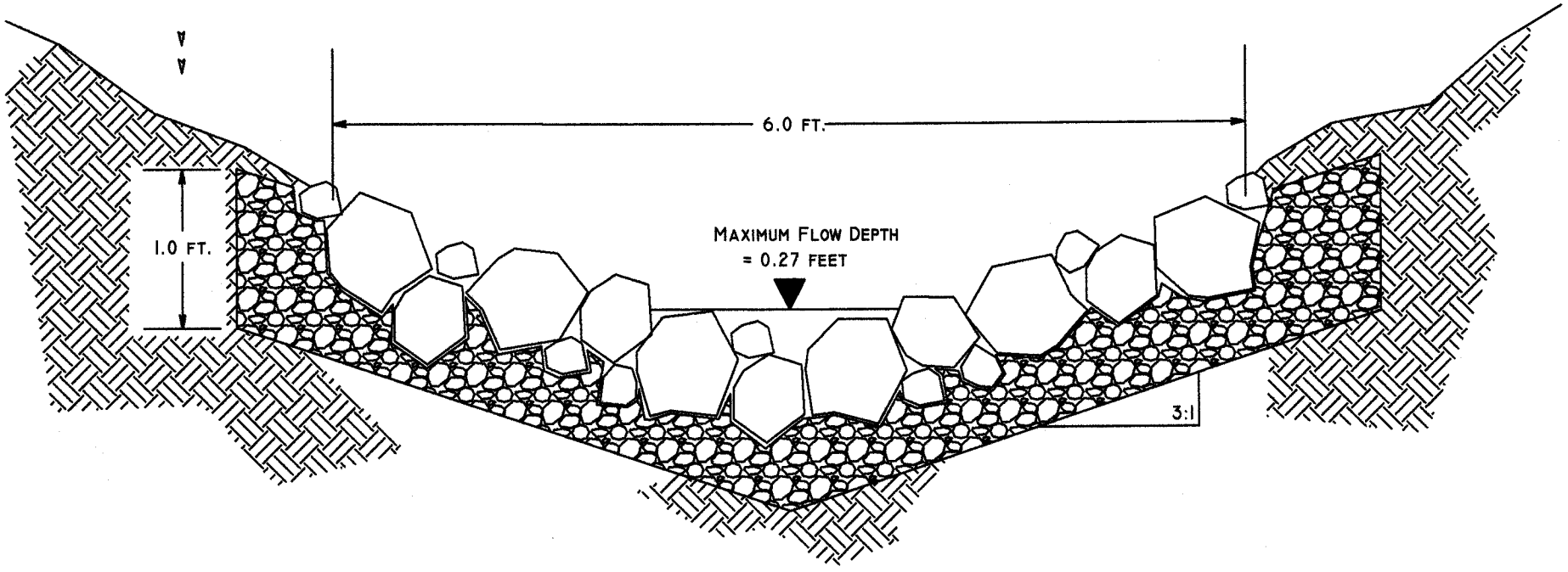
ROCKLAND MINE

TYPICAL PORTAL SEALING PLAN

DRAWN BY:	D. OAKLEY	FIG. 110.2-D
SCALE:	NONE	DRAWING NO.:
DATE:	01/15/2008	SHEET NO.: 1 OF 1

CHANNEL DESIGN CROSS-SECTION



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NOTE:

FILTER MATERIAL CONSISTS OF 1" MINUS WASHED GRAVEL
RIPRAP MATERIAL CONSISTS OF ANGULAR ROCK MATERIAL OF 4-8 INCH
FREE BOARD EQUALS 8.4 INCHES
TOP WIDTH CAN BE REDUCED TO 3.0 FEET AND RETAIN ADEQUATE FREE BOARD

MIRACLE ROCK MINING & RESEARCH ROCKLAND MINE	
TYPICAL CROSS-SECTION CHANNEL DESIGN 100YR/24HR EVENT	
D. OAKLEY	FIG. 110.2-E
NONE	DRAWING NO.:
5/15/2008	SHEET NO.: 1 OF 1

The ROCKLAND MINE

OWNED BY MIRACLE ROCK MINING AND RESEARCH

PHOTOS

Surface Facilities – Portal and Fueling Area

Surface Facility – Temporary Storage Shed

Impoundment

Subsoil Pile

Topsoil Pile

Topsoil Pile

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Topsoil Pile

Topsoil Pile

Topsoil Pile

Topsoil Pile

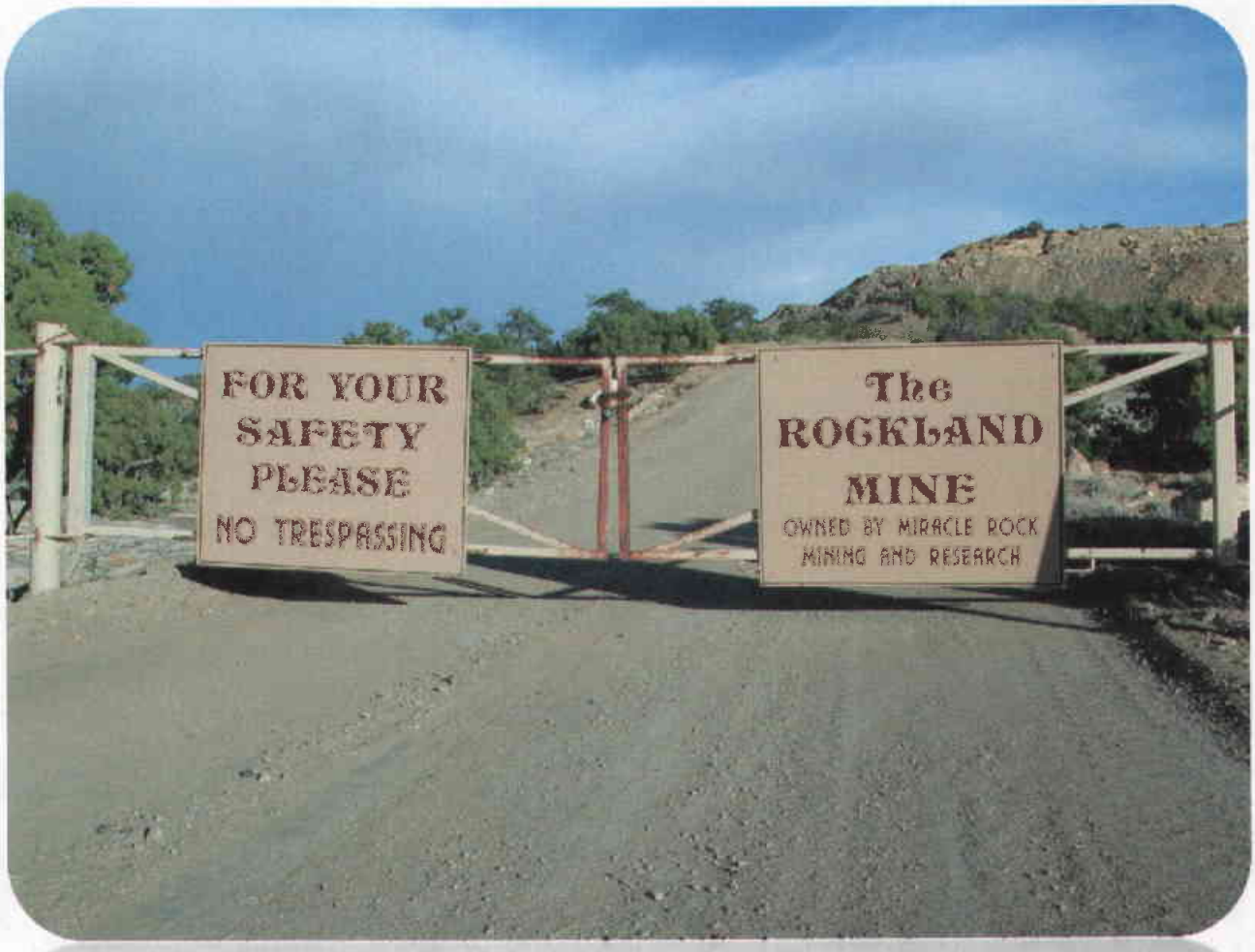
Topsoil Pile

Topsoil Pile

Topsoil Pile

Topsoil Pile

Lockable Gate and Signs



Portals - Restricted to Public Access

Berms

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Adjacent Undisturbed Area

Weathered Rock Escarpments

BMP PSC100: SURFACE ROUGHENING

Other Names:
Deep Gouging, Pocking

Practice:
Requires track-hoe or similar machine to roughen the exposed surface area disturbed during construction in a random and discontinuous fashion use the bucket of the machine. Pockmarks created are up to three (3) feet in diameter and one and one-half (1 ½) feet deep.

Benefits:
Pockmarks are designed to capture or trap precipitation and promote infiltration of water. The gouging techniques serve to control erosion through water retention, thus enhancing vegetation growth.

Limitations:
This technique should not be used on slopes greater than 2 horizontal and 1 vertical. Other methods are available for the stabilization of these types of slopes.

BMP PSC200: SEEDING

Other Names:
N/A

Practice:
This BMP is a permanent form of erosion control of disturbed surfaces. Seed mixes can be applied using one of the three listed methods;

1) Hand Broadcasting – This method requires carrying a seed bucket or seed bag into the disturbed area. The seeder grabs a handful of seed and throws in a circular motion releasing the seed simultaneously. Distribution should be as even as possible.
2) Mechanical Broadcasting – This method requires the use of a Traux brand or similar mechanical applicator. This rotary type applicator is carried by the seeder. The seeder hand cranks the device and walks back and forth across the disturbed area spreading the seed as even as possible. Use manufactures instructions for applying seed.
3) Hydroseeding – This method requires the use of a hydromulching machine. Seed is mixed in a water solution in the tank of the hydromulching machine in a pre-determined amount (i.e.4lbs/ac.). A small amount of wood fiber mulch (500lbs/ac.) should be added to the solution to aid in identifying the area sprayed. Spray the solution over the entire disturbed area and apply as evenly as possible.

Benefits:
An even distribution of seed mix will allow a consistent vegetative growth to control erosion. Mechanical and hydroseeding provides a more consistent coverage.

Limitations:
Vegetative erosion control could take some time to establish. Temporary erosion control practices must be left in place during establishment.

BMP PSC300: Hydromulching

Other Names:
N/A

Practice:
Hydraulic mulches can be made of recycled newsprint, magazines, wood or other wood/ paper waste sources. This type of mulch is to be mixed in a hydraulic application machine(hydromulcher) and applied as a liquid slurry that contains the recommended rates hydromulch for the site. It can be specified with or without a tackifier. Apply at rate of 1.5 to 2 tons per acre.

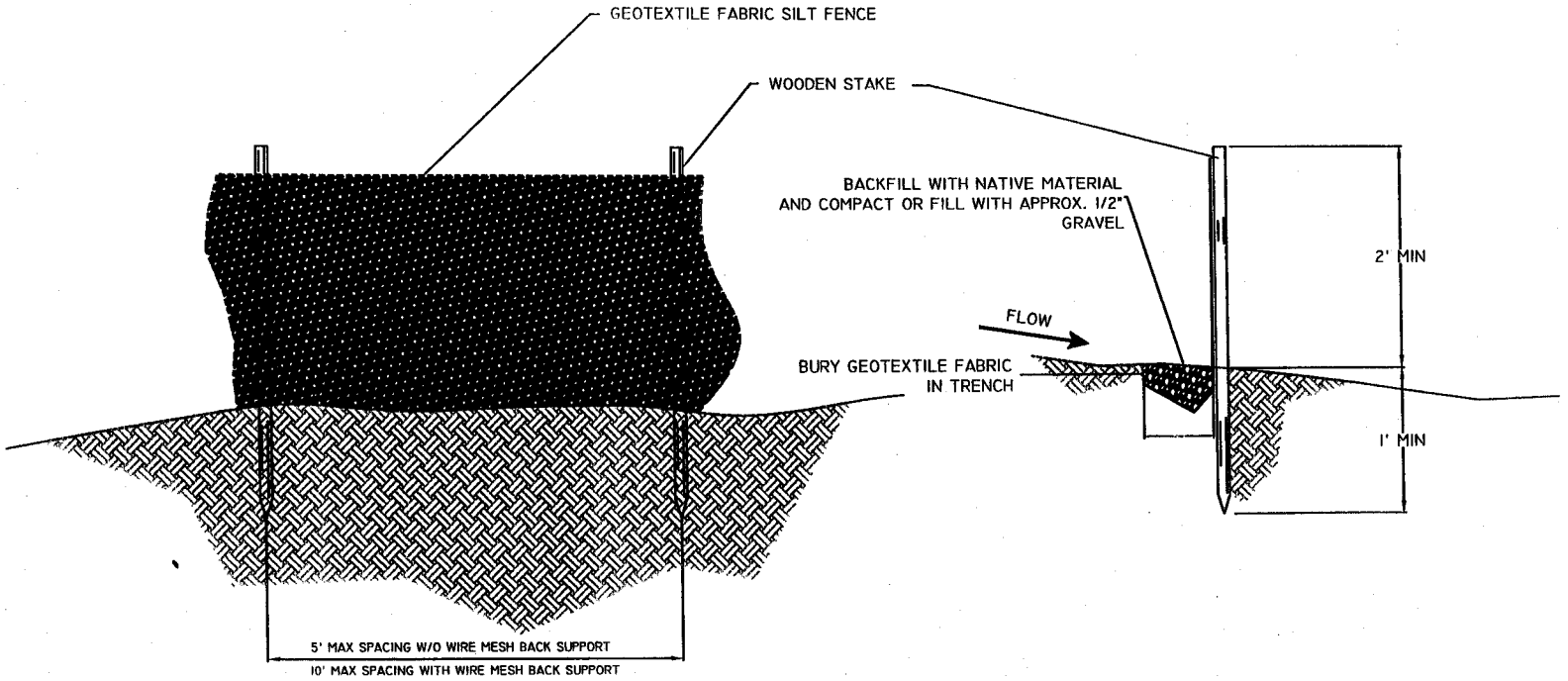
Benefits:
An even distribution of hydromulch retains soil moisture and keeps seed from blowing away. Hydromulch applications also reduce interrill erosion the occurs from raindrop impacts.

Limitations:
May be too expensive for small or very remote sites; must dry for at least 24 hours before rainfall.

NOTES:
INSTALL SILT FENCE ALONG CONTOURS WHEN EVER POSSIBLE

WRAP ENDS SLIGHTLY UP-SLOPE TO PREVENT SEDIMENT FLOWING AROUND ENDS

PERFORM MAINTENANCE MONTHLY AND IMMEDIATELY AFTER STORMS



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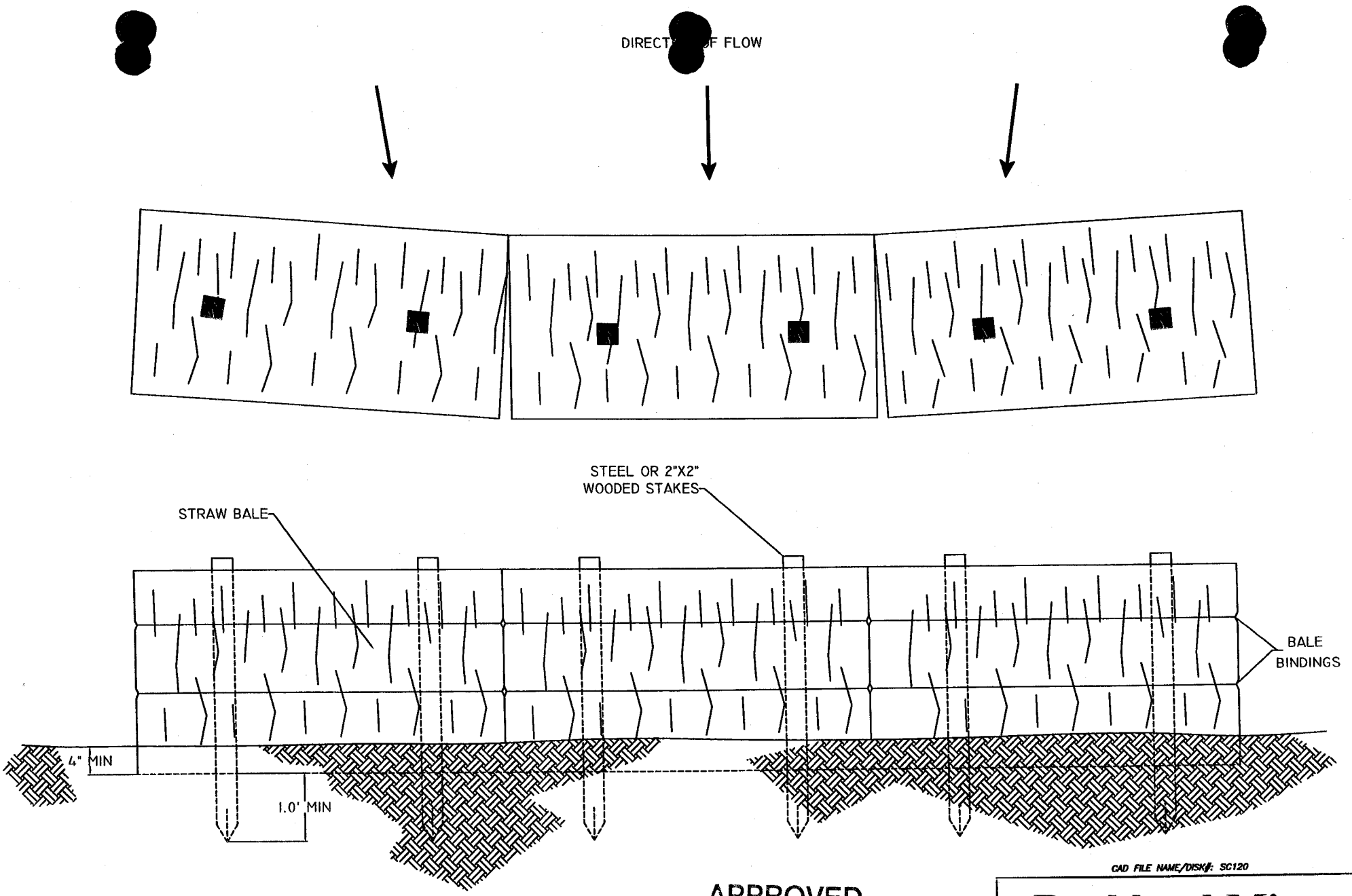
CAD FILE NAME/DISK#: SC110

Rockland Mine

SILT FENCE DETAIL
SWPPP BMP'S
TYPICAL DRAWING

DRAWN BY: DENNIS OAKLEY	SC110
SCALE: NONE	DRAWING #:
DATE: 3/7/2007	SHEET 1 OF 1 REV. ---



NOTES:

INSURE TIGHTLY ABUTED ENDS TO ELIMINATE LEAKAGE
KEY BALES INTO GROUND TO PREVENT FLOW UNDER BALES
COMPACT EARTH MATERIAL AROUND BASE OF BALES
USE TWO STAKES PER BALE TO SECURE IN PLACE

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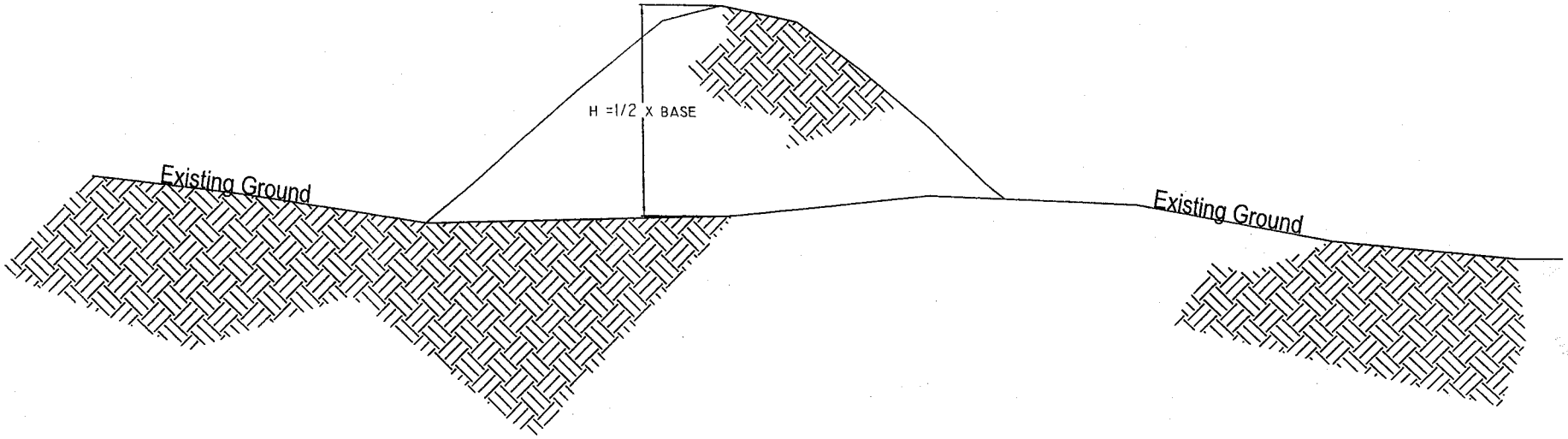
CAD FILE NAME/DISK#: SC120

Rockland Mine

STRAW BALES
SWPPP BMP'S
TYPICAL DRAWING

DRAWN BY: DENNIS OAKLEY	SC120
SCALE: NOT TO SCALE	DRAWING #:
DATE: 3/7/2007	SHEET 1 OF 1 REV. ___



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NOTES:
HEIGHT EQUALS 1/2 WIDTH OF BASE
BERM IS SLIGHTLY COMPACTED FOR STABILITY
USE FOR SEDIMENT CONTAINMENT

CAD FILE NAME/DISK#: D202

Rockland Mine

BERM
SWPPP BMP'S
TYPICAL DRAWING

DRAWN BY:	DENNIS OAKLEY	D202	
SCALE:	NOT TO SCALE	DRAWING #:	
DATE:	3/7/2007	SHEET 1 OF 1	REV.